

NETWORK WORLD

The Newsweekly of User Networking Strategies

Volume 7, Number 14

An International Data Group Publication

April 2, 1990

Network World forms
User Advisory Panel
see page 30

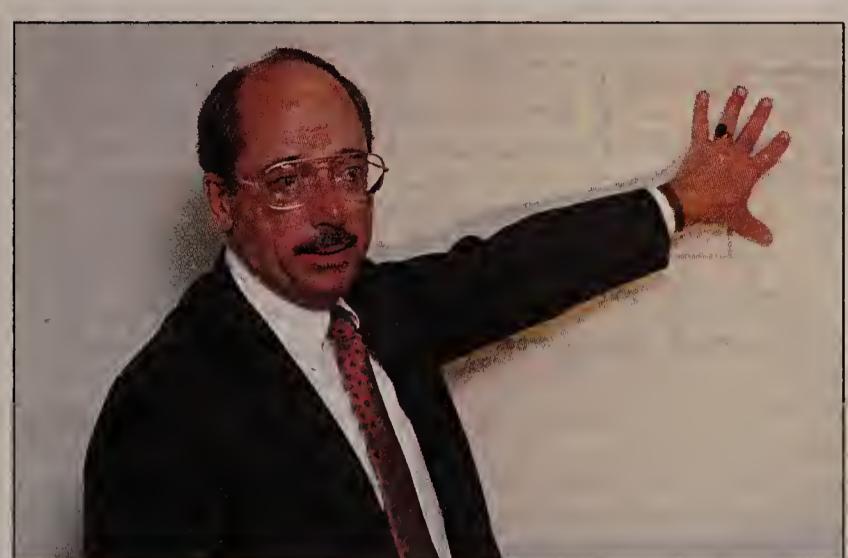
IBM readies distributed DBMS tools

By John Gallant
Editor

SAN JOSE, Calif. — Senior IBM executives last week said the company will soon unveil a master blueprint and new products for centralized control of distributed data bases in network environments.

The architecture will include common interfaces and services that IBM and developers can use to build tools that enable customers to monitor and control IBM and non-IBM distributed data bases from a single workstation.

Company officials, who discussed IBM's plans during a strategy briefing for *Network World* at the company's Santa Teresa Laboratory here, likened the architecture to IBM's AD/ (continued on page 52)



IBM's Norris van den Berg

IBM data base strategists discuss distributed DBMS



It's been three years since IBM introduced its Systems Applications Architecture (SAA). And while IBM continues to ready its first SAA application, OfficeVision, it is also working to deliver distributed data base support under the SAA umbrella.

Last week, three of IBM's top data base strategists spoke with *Network World* at IBM's Santa Teresa Laboratory, nestled in the hills of southern San Jose, Calif. Norris van den Berg, manager of strategy and market planning, Larry Morgan, senior programmer, and George Zagelow, manager of architecture and standards, talked about IBM's distribut-

ed data base strategy and the challenges the company faces in making it a reality.

At its core, IBM's strategy is to use LU 6.2 to provide peer-to-peer communications between SQL-based data bases running on its SAA hardware platforms. The data bases covered in that strategy are DB2 on MVS-based hosts, SQL/DS on VM hosts, SQL/400 on Application System/400s and OS/2 Extended Edition Database Manager on Personal System/2s.

During the interview with *Network World* Editor John Gallant and Senior Data Communications Editor Jim Brown, the IBM executives said (to page 51)

IBM reveals plan to enhance 3745 FEP with FDDI, T-3 and ISDN support. See page 6.



IBM's Larry Morgan

NETLINE



NEW RELEASE OF CODEX network control system boasts direct link to IBM's NetView. Page 2.

US SPRINT PLANS intercontinental VPN offering. Page 2.

TOP ROUTER VENDORS stand behind proposed Internet mix-and-match protocol. Page 2.

NEWSPAPER

JUDGING BY DB/EXPO '90, desktop access to enterprise data is a long way off. Page 6.

FDDI VENDORS DISCUSS challenge to Soderblom token-ring patent. Page 7.

THE VAST POTENTIAL of E-mail is only now being recognized. Page 35.

AT&T targets office with LAN groupware

Rhapsody runs on LAN Manager Unix servers; packages groupware with office applications.

By Laura DiDio
Senior Editor

NEW YORK — AT&T last week announced groupware software for LAN Manager Unix-based LANs that is intended to increase the efficiency of work groups by providing tools to distribute tasks and track work in progress.

AT&T's Rhapsody Business Orchestration Solution, due out in the third quarter, integrates popular personal computer applications such as Lotus Development Corp.'s 1-2-3 with communications capabilities and two work flow management applications developed by AT&T Bell Laboratories.

Rhapsody uses an intuitive, icon-based end-user interface and makes it possible to send tasks to individuals or groups, distribute reports and track the status of project elements.

"We've built a product that allows individual users or groups of users on the LAN to automate all of their daily business tasks — from a simple function such as incorporating document and spreadsheet files into an E-mail message, to more complex tasks like coordinating meetings or teleconferencing calls among people in remote locations," according to Bill Nelson, AT&T's marketing director in the Com-

puter Systems Group.

Rhapsody will compete with existing office automation packages such as IBM's OfficeVision, Hewlett-Packard Co.'s NewWave Office and Digital Equipment Corp.'s All-in-1.

Rhapsody has a client/server architecture in which AT&T LAN Manager Unix servers support MS-DOS clients on Ethernet, 4M bit/sec token-ring or AT&T 10M bit/sec Starlan LANs.

The server software runs on AT&T's 6386 WorkGroup System (WGS) file servers under Unix System V Release 3.2. The servers must be equipped with a mini- (continued on page 50)

ICA report blasts RBHC freedom bid

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The RBHCs are waging a "disinformation campaign" funded by ratepayers and aimed at winning the carriers greater regulatory freedom, according to a report released last week by the International Communications Association (ICA) and a leading consumer watchdog group.

The report accuses the regional Bell holding companies of publishing faulty research and alarmist ads designed to convince lawmakers, regulators and the public that line-of-business restrictions should be dropped.

Dubbed "The Telecommunications Infrastructure in Perspective," the report was sponsored by the ICA and the Consumer Federation of America (CFA). It was prepared by the Boston-based research firm Economics and Technology, Inc. (ETI).

The RBHC campaign, which ICA legal counsel Brian Moir said is being funded with \$21 million of ratepayers' money, is based on the premise that the U.S. network has become second-rate compared with nets in other industries (continued on page 55)

FEATURE

Source routing addresses token net bridging needs

By Everett Thiele
Special to Network World

In simpler times, most users only had to deal with one local-area network bridging scheme: the transparent, or spanning tree, protocol used with Ethernet LANs.

Today's network users also need to understand source routing, which debuted in 1985 when IBM unveiled its Token-Ring Network. Some LAN operating systems, such as IBM's PC LAN Program and OS/2 Extend-

ed Edition Version 1.1, are designed to work only with source routing bridges.

However, some vendors don't use source routing in their LAN operating system software. Instead, they supply transparent spanning tree bridges, even for token-ring applications.

Transparent bridges compute the shortest distance from the bridge to all points on a network and use this information to route traffic accordingly. In (continued on page 33)

New release of Codex 9800 boasts direct NetView link

Net management system can manage devices at multiple sites, control third-party net equipment.

By Tom Smith
New Products Editor

MANSFIELD, Mass. — Codex Corp. last week announced a new release of its 9800 Network Management System that supports a direct link to IBM's NetView, enabling Codex modems and multiplexers to send alarms to NetView and accept commands from the host-based net control system.

Besides adding the bidirectional control abilities, Release 3 of the software allows users for the first time to manage Codex devices from multiple sites. The software can also translate event and alarm messages from a variety of third-party and Codex devices, enabling those devices to

be managed by the 9800.

The NetView link fulfills a promise made last year ("Codex offers new version of integrated control tool," *NW*, May 1, 1989).

Like earlier versions of the 9800, Release 3 runs on a Domain Series 3000 workstation from the Apollo Division of Hewlett-Packard Co. and provides a graphical view of a network.

It can be used to manage Codex's 2600 high-speed leased-line modems, 2500 Series modems, 2123 limited-distance modems, 2150 and 2160 Digital Service Unit/Channel Service Units, Model 6740 Concentrator, 6760 statistical multiplexer, as

(continued on page 50)

US Sprint to unveil int'l VPN service at ICA show

By Barton Crockett
Senior Editor

KANSAS CITY, Mo. — US Sprint Communications Co. will detail plans at a conference next month for an International Virtual Private Network (IVPN) service spanning three continents, a senior executive told *Network World* last week.

At the International Communications Association's (ICA) annual conference and exhibition in New Orleans, US Sprint is scheduled to introduce IVPN service to the U.K. and Hong Kong, according to Bill Burgess, the carrier's vice-president and general manager of international telecommunications services.

Although the company had previously announced that it intended to offer IVPN by this month, the carrier will use the ICA event to explain what the service will actually look like when it is cut over in the third quarter.

Burgess said the service will be provided in conjunction with Cable & Wireless PLC subsidiaries Mercury Communications, Ltd. and Hong Kong Telecommunications.

Services provided will include switched 56K and 64K bit/sec links, international seven-digit dialing plans, integrated IVPN network management, international call detail recording, call-

(continued on page 54)

Router firms rally round interoperability protocol

Vendors back Internet's proposed PPP protocol.

By Tom Smith
New Products Editor

A group of leading router vendors last week pledged to support a proposed Internet protocol standard that will allow users for the first time to mix and match the devices on wide-area networks.

Proteon, Inc., 3Com Corp., Viatel Communications Corp. and Wellfleet Communications, Inc. last week said they plan to support the Point-to-Point Protocol (PPP), while Cisco Systems, Inc. said it will ship software upgrades this week that include PPP support. PPP is a data link-layer protocol that defines a standard

method of encapsulating Internet Protocol (IP) data. Proposed by a working group of the Internet Activities Board's Internet Engineering Task Force (IETF), PPP is expected to become a draft standard following the IETF's May meeting and a full Internet standard within a year.

PPP is intended to replace proprietary data link-layer protocols used by the various internetworking vendors and make it possible to build internetworks with a mix of products.

Existing routers use different data link protocols to envelop transport protocols. Although

(continued on page 54)

Briefs

Take a look. IBM last week said both ANSI and the International Standards Organization have agreed to review the company's remote data base access (RDA) specifications. RDA defines how users access data bases on remote systems. IBM's RDA specifications are being implemented in its Systems Application Architecture-based distributed data base architecture, which calls for use of LU 6.2 for peer-to-peer communications between SQL-based data base management systems.

IBM's hope is that at least portions of its RDA specifications will be included in the international standard, saving the company work in retrofitting DBMS products to support the international RDA standard after it is finally adopted.

Such a deal. PictureTel Corp. last week said users can trade in any other vendor's coder/decoder (codec) and get a PictureTel C-3000 for only \$10,000 plus installation. The PictureTel codec usually sells for almost \$30,000. The C-3000 will support the CCITT Px64 standard, which will allow multivendor codecs to communicate at speeds from 64K bit/sec to U.S. and European T-1 rates.

The offer will give the Peabody, Mass.-based vendor an edge over rivals that are trying to distinguish themselves on price or Px64 support alone, said Eliot Gold, president of Altadena, Calif.-based TeleSpan Publishing Corp.

"I think it's very shrewd from a marketing standpoint," he said.

Making the cut. AT&T last week revealed how it will cut 6,000 jobs in its Network Services Division. The previously announced work force reduction is expected to save the carrier \$300 million annually.

AT&T will reduce the number of work centers, which include network operations centers, from 160 to 100. The company will refocus existing customer service centers to serve specific customers and network technologies, such as enhanced private-line services, rather than geographic areas. AT&T also will reduce the number of centers managing the long-distance network from 38 to six.

The reductions stem from AT&T's \$18 billion net modernization program, started in 1984, that has allowed the company to consolidate operations. The job cuts will affect nonmanagement employees. Last year, 2,400 managers left the same division.

Handing it over. As part of its exit from the hardware business, Novell, Inc. today is expected to announce that it will hand over production of its NetWare for Macintosh LocalTalk adapters to Dayna Communications, Inc. Dayna Communications' DL2000 will replace Novell's NL1000 LocalTalk adapter, and its DL/2 will take the place of Novell's previously announced NL/2 LocalTalk adapter.

Novell, based in Provo, Utah, and Salt Lake City-based Dayna Communications worked jointly to develop NetWare for Macintosh and the DaynaTalk line of Novell-certified LocalTalk adapters.

CONTENTS

Industry Update

IBM's and DEC's anticipated plunge into the FDDI market presents interesting choices for users with high-speed net needs. **Page 11**

Telecommunications

Although divestiture introduced competition to the telecom industry, some observers say that little has been done since then to manage the transition to a competitive marketplace. **Page 13**

Data Communications

Users in Europe are looking to OSI to ease communications within their own firms as well as with suppliers and customers. **Page 15**

Local Networking

Interlink moves into the bridge and router markets with the introduction of three aggressively priced products. **Page 21**

Management Strategies

The proliferation of LANs and the drastic advances made in LAN server capacity have increased the need for network administrators whose responsibility is LAN security and data backup. **Page 23**

International Networks

NTT is turning up the heat in the increasingly competitive Japanese network market by reducing private-line charges up to 26% and cutting standard long-distance costs an average of 15%. **Page 25**

Products & Services

Nixdorf software lets the firm's Unix-based Targon superminicomputer communicate as a peer with IBM mainframes. **Page 27**

Inside

Opinions

Letters

Networking Marketplace

Networking Careers

30

31

47

47

Network World wants you. If you have a news tip, please contact us. We'd also like to hear about unusual network applications and how you're optimizing your networks for performance or savings. Contact Editor John Gallant at (800) 622-1108, ext. 426, or through MCI Mail at 390-4868.

Network World
161 Worcester Road
Framingham, Mass. 01701-9172
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: \$3.00 a copy; U.S. — \$95 a year; Canada, Central & South America — \$110 a year; Europe — \$165 a year, all other countries — \$245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label appearing on front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int'l, Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by Network World, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus 50 cents per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

POSTMASTER: Send Change of Address to *Network World*, 161 Worcester Road, Framingham, Mass. 01701-9172.

Copyright 1989 by Network World, Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.

The Audit Bureau

BERP

Reprints (minimum 500 copies) and permission to reprint may be purchased from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

If you think all 800/WATS services are created equal, get with the program.

Introducing FONVIEWSM from US Sprint. It eliminates all those hours sifting through pages of 800/WATS call detail reports. It saves you money by pinpointing the smartest ways to utilize these services.

It's the most comprehensive call management program designed for a PC. Virtually any PC that's IBM[®] compatible.

You can store the equivalent of a 1,000 page phone bill on a single floppy. And do a week's worth of billing analysis in a single afternoon.

So fill out the coupon and fax it to us for a free floppy demonstration disk or call 1-800-877-2000.

FONVIEW. It's one new program you won't want to miss.

It's a new world.SM

fonview/fōn-vyu n. 1. US Sprint's smart way to save on 800/WATS service. 2. An analytic software package that saves time and money. 3. The most comprehensive call management program designed for a PC.

For a free FONVIEW demonstration disk:

FAX 1-800-366-3295

Name Title

Company

Average monthly phone bill

Address

City/State/Zip NW4



The Macintosh was made to be different. But that doesn't mean you have to treat it any differently than the other devices on your network.

In fact, the way Avatar sees it, you can integrate the Mac into your network just like any other personal computer, regardless of the networking environments you've chosen.

With a MacMainFrame Macintosh-to-mainframe solution, you have a breadth of connectivity options that put an end to integration conflicts and user retraining.

For the very first time, Macintosh users in Ethernet, Token Ring, Local Talk or traditional coax networks can tap centralized information — statistical, financial, customer records, even mainframe-based mail systems—to make every Mac user's desktop all the more powerful.

MORE CHOICES. MORE SOLUTIONS.

With MacMainFrame, Avatar presents the broadest range of high performance Macintosh-to-mainframe connectivity options available. Letting you distribute terminal emulation, file

HOW OTHERS SEE THE MACINTOSH-TO-MAINFRAME CONNECTION.



transfer, printer emulation and mainframe graphics across a range of networks.

You can provide mainframe services to every Mac user across SDLC, Token Ring or traditional coax networks, in direct workstation or gateway configurations, whether your users are local

or whether they're remote.

MacMainFrame SDLC workstation and gateway products allow multisession host access across wide area networks at speeds up to 56Kbps—and eliminate the need for an IBM control unit.

Migrating up to Token Ring? You can choose both in-

dividual and gateway solutions.

And there are high performance coax connections in CUT and DFT versions for individual users. Cost-effective coax gateways are available, too.

And because Avatar has designed MacMainFrame Gateway products using

HOW AVATAR SEES IT.



Apple Data Stream Protocols (ADSP), Mac users on any AppleTalk network can access mainframe services regardless of the connection.

When customization is needed, there's Avatar's Programmer's Toolkit with a full range of Applications Programming Interface (API)

tools. One of them, Avatar's Hypercard API, was used to develop a front end system to PROFS, the corporate electronic mail system.

THE MACMAINFRAME DIFFERENCE.

Once you discover the Avatar MacMainFrame solution, you'll notice the difference. Un-

like some Mac-to-mainframe connections, MacMainFrame enhances the benefits of the Mac rather than inhibits them. Users retain all standard conventions of Macintosh, from mouse control and pull-down menus to copying and pasting. So they're able

to access mainframe information without sacrificing the Mac user experience.

Since MacMainFrame is completely IBM 3270 compatible, the Macintosh connection has no impact on normal operations. The result? An integrated working environment that increases productivity and reduces headaches.

SOMETHING ELSE WE SEE. SERVICE.

After eight years of experience, Avatar offers something beyond products and technology: responsiveness. As the 3270 connectivity specialists, we've helped integrate the Macintosh into many different environments. And we can do the same for you.

To find out how, write us or call us toll-free:

1-800-289-2526.

You'll find that we understand Macintosh-to-mainframe connectivity like no one else. So as your network options continue to grow, Avatar can help you see the forest through the trees.

Avatar

PC LANs barely evident at DB/Expo data base confab

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — If the exhibits at the DB/Expo '90 data base conference here last week were any indication, the day is

still a long way off when microcomputer LANs will be capable of delivering to the desktop a view of the data distributed across an enterprise-wide network.

Suppliers such as IBM and Dig-

ital Equipment Corp. did not even include local-area networks in their relational data base management showcases, and other exhibitors seemed puzzled when asked whether their new products supported popular LAN environments such as Novell, Inc.'s NetWare.

The show itself was enormously successful, attracting nearly three times the exhibitors

and attendees that participated in the inaugural show in 1989. The conference sessions, held in huge ballrooms, were jammed, but none of them focused directly on networking issues.

"With regard to networks, I don't think anyone knows what's going to be there," said data base expert Richard Finkelstein, president of Performance Computing, Inc. of Chicago and a member of

DB/Expo's advisory board. "The vendors themselves don't know. It's overwhelming."

There seems to be a major gap between the networking and data base worlds that needs to be bridged by people versed in both areas.

"Just as we have heterogeneous computing environments, we need heterogeneous experts

(continued on page 54)

IBM 3745 to support T-3, FDDI, ISDN

By Paul Desmond
Senior Writer

LA GAUDE, France — IBM executives last week outlined plans to enhance the 3745 Communication Controller by adding interfaces for Fiber Distributed Data Interface (FDDI) LANs and wide-area T-3 and ISDN Primary Rate Interface (PRI) transmission facilities.

In interviews with *Network World* here, where IBM conducts its 3745 research and development, executives said they are evolving the 3745 to keep up with emerging high-bandwidth applications and ever-faster transmission options, but they promised not to alter the basic 3745 architecture.

"The 3745 is a strategic product for IBM and will get us well into the 1990s on its current platform," said Antoine Granatino,

(continued on page 55)

British Tel rolls out net mgmt. plans

By Bob Brown
Senior Editor

NEW YORK — British Telecommunications PLC last week said it plans to develop an OSI-based integrated network management system that would give users end-to-end oversight of their public or private voice and data nets.

British Telecom's Concert net management system would enable customers to use a single workstation to manage other net management systems, called element managers, from British Telecom and other vendors.

The system is in the planning stages — few product details were given and no specific delivery dates were divulged. But the company said the system will initially be based on a Sun Microsystems, Inc. workstation and later made available on platforms

(continued on page 50)

NetWare 386 sets new standards for performance, architecture, sheer power, and flexibility. NetWare 386 is even 486-aware, the first commercial program to be so. It opens up

PC MAGAZINE, Jan. 16, 1990

Although such capacity in a PC LAN is breathtaking, it isn't Netware 386's only boon. Management woes have been greatly reduced. With dynamic resource configuration, a network manager can allocate RAM in real time.

LAN Magazine, Feb. 1990

Novell NetWare 386

Novell upped the network ante in 1989 with a true 32-bit server operating system, Netware 386. This version features support for up to 250 users, easier installation and setup, an innovative and more reliable method of managing additional

InfoWorld, March 5, 1990

The most significant improvement in NetWare 386 is the result of the 32-bit architecture. Novell NetWare 386 (version 3.0) permits vastly greater numbers of users on a server, improves performance and security, and is significantly easier to install.

BYTE, January 1990

After everything that's been said about NetWare® 386,

©1990 Novell Inc., World Headquarters, 122 East 1700 South, Provo, Utah 84606 (801) 379-5900

FDDI vendors may unite to fight Soderblom in court

By Laura DiDio
Senior Editor

Vendors of Fiber Distributed Data Interface (FDDI) products last week said they are informally discussing the possibility of filing

a class action suit to block token-ring patent holder Olof Soderblom from extracting royalty payments on their net products.

Executives and engineers with at least a dozen FDDI vendors say

they have discussed having vendors contribute funds to amass a war chest that could be used in a legal action to invalidate Soderblom's patent. FDDI is based on token-ring technology.

"The general opinion is that Soderblom should never have gotten the patent in the first place," said Greg Chesson, chief engineer at Silicon Graphics, Inc. in Mountain View, Calif. "I think

the U.S. Patent Office failed to serve the public interest, and now the token-ring and FDDI community has to carry this parasite on our backs.

"It will take at least \$1 million to \$2 million to fight him in court, and many small companies don't have that kind of money," Chesson said. "Soderblom has deep pockets thanks to 10 years of roy-

(continued on page 52)

Voice mail gives edge to Travelers

By Bob Wallace
Senior Editor

ANAHEIM, Calif. — The Travelers Corp. is using leading-edge voice processing technologies to provide its policyholders with around-the-clock access to claims status and benefits data, and to improve communications with key business partners.

Travelers, one of the country's largest insurance firms, laid out its voice processing strategy here last week at the Voice '90 Conference and Exhibition, which drew more than 2,200 attendees and featured 175 vendor exhibits.

The three-day conference was cosponsored by Information Publishing Corp., a publishing company in Houston, and Vanguard



InfoWorld
1989 Product of the Year

LAN Magazine
1989 Product of the Year



BYTE
1989 Annual Product Award



PC Magazine
1989 Technical Excellence Award

we're honored.



For network solutions,
you should be seeing red.

P rerecorded voice prompts are used to communicate with the caller.



Communications Corp., a Santa Clara, Calif.-based consultancy.

E.W. Bender, second vice-president of data processing for Travelers, said use of voice response units has cut call volumes at the company's three customer service centers — which range in size from 10 to 40 agents — by roughly 30% and has enabled the insurance firm to offer policyholders a higher degree of customer service.

Conversant system

Customers can get claim status, general policy information and other information maintained on Travelers' IBM mainframe data bases by dialing an 800 number, keying their password into an AT&T Conversant system and using the keypad of their push-button phone to interact with the data base.

Prerecorded or synthesized voice prompts are used to communicate with the caller, providing instructions, confirming push-button entries and translating data from the computer into speech. Because the Conversant systems are integrated with Travelers' AT&T private branch exchanges, the devices can pass calls to customer service representatives if the customer needs additional information, Bender explained.

"Automating this insurance
(continued on page 55)



How AT&T 800 Service can keep up with the speed of the Pony Express.



keep you from going the way

The Pony Express was the most exciting, fastest way to send information in its day. But riders had to change their exhausted horses frequently. This was an accepted cost of doing business then, but today, switching from a worn-out 800 service can cost your company thousands of dollars.

But that won't happen if you choose AT&T. That's because AT&T uses out-of-band signaling. And only AT&T is using this technology to deliver the state-of-the-art 800 service capabilities you want today with its high-performance AT&T MEGACOM® 800 Service. For instance, AT&T is the only long distance company delivering ANI based on out-of-band signaling. Over 30 of our AT&T MEGACOM 800 Service customers are already enjoying the benefits of INFO II capability and the fastest ANI delivery available today.

In addition, because our architecture is ISDN-based, your 800 capabilities won't be limited only to ANI. We also offer call-by-call service selection, which maximizes inbound 800 call completions. And you get transmission of voice and data on the same line. Something not offered today by MCI®.

And since our architecture is the global industry standard, you can be sure that your 800 investment will be protected in the future. That way, when you want to add new capabilities such as transferring 800 calls to another location or allowing customers to enter additional information or account codes while they're on the line, you won't have to start over from the beginning. The way you might with in-band signaling.

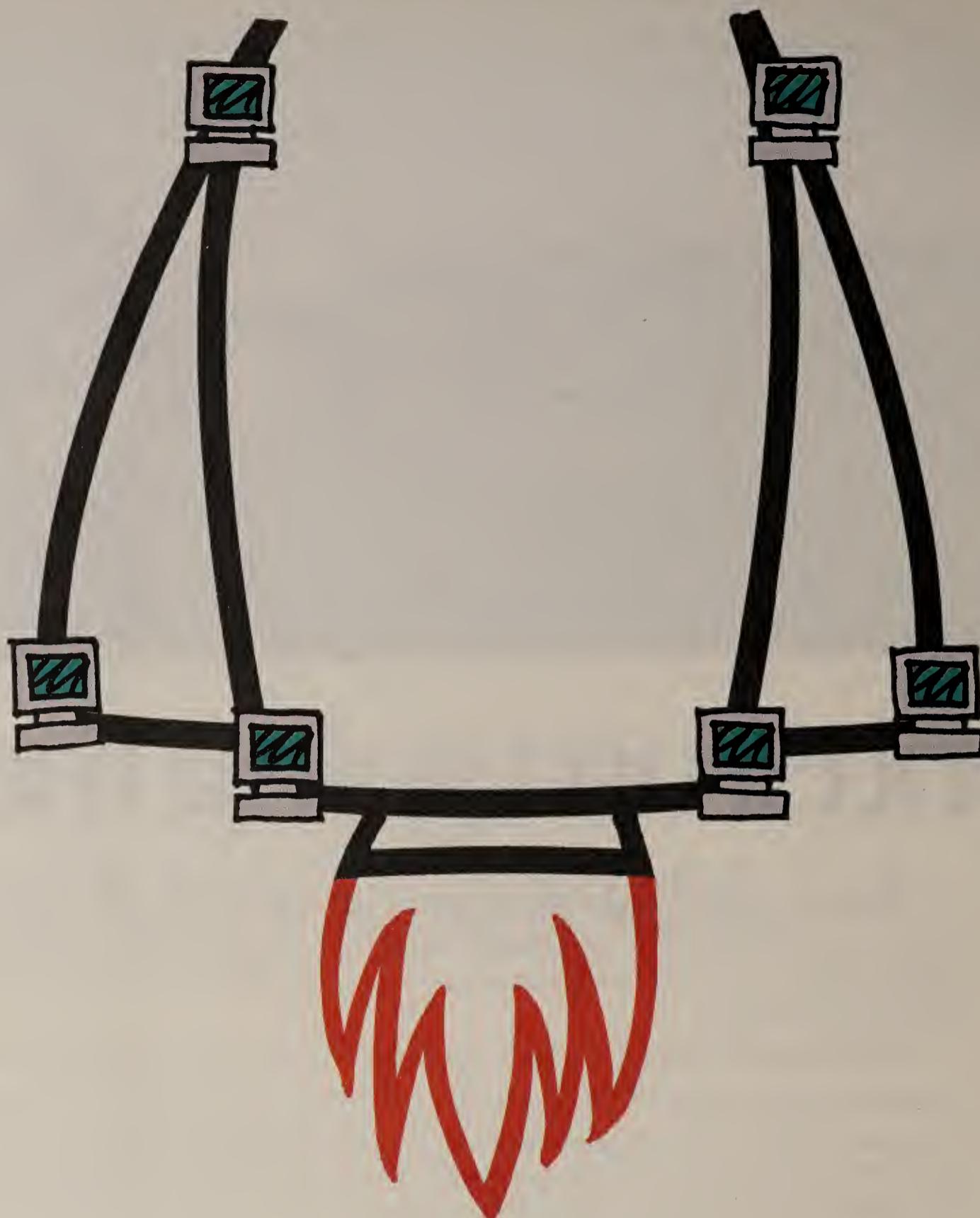
So don't put yourself in a position where you have to get another horse. Get set, not just for today, but for the future. With AT&T.

Innovation. Another AT&T advantage.

For more information, call your AT&T Account Executive or 1 800 222-0400.



AT&T
The right choice.



Just How Fast Are Those Western Digital Ethernet Boards?

We'll make this quick.

At Western Digital, we have a full line of Ethernet boards that are so fast, you'll swear they were designed by rocket scientists with names like Otto.

Our 16-bit EtherCard PLUS16™ board is borderline ballistic. It makes most other boards in its class look about as fast as a glacier.

In fact, a major network software manufacturer recently told us it was the fastest board they've ever tested. (For obvious reasons, we can't tell you who the company is. But if you don't know, knock off early for once, put your feet up on the desk, and catch up on some of those trade magazines you've been too busy to read).



We also have the fastest Micro Channel and twisted pair Ethernet boards known to man, woman or child.

But Western Digital boards give you more than blazing LAN speed.

They also give you compatibility in virtually any, every and all environments. So you can get all those good things like increased throughput and better price performance no matter what board you choose. Or where you use it.

If you want to know more about any Western Digital Ethernet board, ask your local LAN supplier or call 1-800-NET-LEADER.

So if you want to get up to speed, get on the phone.

EtherCard PLUS and EtherCard PLUS16 are trademarks of Western Digital Corporation. All other marks mentioned herein belong to other corporations.

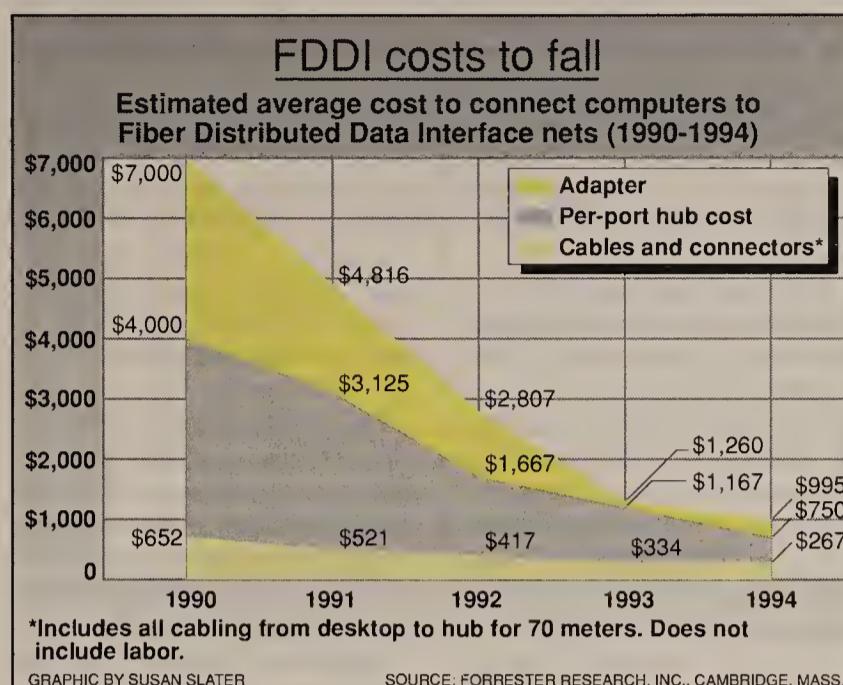
WESTERN DIGITAL
Semiconductors—Storage—Imaging—Communications

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

In its annual report, local and long-haul carrier United Telecommunications, Inc. said it plans to ask shareholders in April for permission to change its name to Sprint Corp. after it buys out the 19.9% stake in US Sprint Communications Co. from its partner, GTE Corp.



Report predicts FDDI hub, adapter prices to plummet

Improved packaging to lead to 82% price drop.

By Bob Brown
Senior Editor

CAMBRIDGE, Mass. — Fiber Distributed Data Interface (FDDI) equipment prices are expected to plunge roughly 82% by 1994, according to a report by Forrester Research, Inc., a Cambridge, Mass.-based market researcher.

The cost of FDDI products will plummet mainly as a result of packaging improvements in chipsets and optical components, as well as increased competition between FDDI vendors and growing user demand, according to the report, "FDDI: A Dose of Reality."

The report predicted that FDDI adapters, which connect a workstation or computer to an FDDI network, will fall from an average price of \$7,000 today to just \$995 by 1994. Likewise, the per-port cost of an FDDI hub will drop from \$4,000 to about \$750 over the same time span (see chart, this page).

Packaging improvements in chipsets and optical components, as well as increasing competition,

FDDI adapters will fall from an average price of \$7,000 today to just \$995 by 1994.



tion, will be the driving forces behind price drops between 1990 and 1992. Growing demand and competition will further spur price declines in 1993 and 1994, the report stated.

"Much of the high cost associ-

ated with FDDI is caused by an underdeveloped supply of components," said Mary Modahl, director of network strategy research at Forrester Research. "Once chipsets are shrunk and standardized, and optical compo-

“User won't implement FDDI to the desktop until they need the bandwidth.”



nents from different suppliers are interchangeable, vendors' costs will fall dramatically."

Vendors' savings will then be passed onto users, she said.

Growing use of plastic, rather than glass fiber, will also drive FDDI product prices down, according to Modahl. "Plastic fiber will slash installation times because it won't have to be polished and glued as glass fiber does," she said. "And the cable itself will be cheaper as well."

Even though chipset and optical component prices will fall during the next few years, demand is not expected to blossom until about 1993, Modahl said. This is particularly true regarding desktop installations of FDDI, she said.

"Users won't implement FDDI to the desktop until they need the bandwidth," Modahl said. "That is going to happen as a result of new software applications that need networks."

Users are expected to begin installing FDDI backbones during the next few years, she said.

Users face complex choices in FDDI market

IBM's and DEC's vow to enter market could force users to rethink their FDDI procurement plans.

By Bob Brown
and Laura DiDio
Network World Staff

IBM's and Digital Equipment Corp.'s anticipated plunge into the fledgling Fiber Distributed Data Interface (FDDI) market later this year presents some interesting choices for users with high-speed network needs.

The question is whether to buy existing FDDI 100M bit/sec local-area network products from lesser known vendors such as Fibronics International, Inc. and FiberCom, Inc., or to hold out for products from systems vendors.

According to industry observers, there will be good reasons to do both.

Existing FDDI vendors point out that they have been offering products for some time and are the only companies with proven technology. They are focusing on the FDDI backbone connectivity market by selling products such as routers and bridges that make it possible to use FDDI networks to support various general-purpose LANs.

These vendors say they will provide higher performance FDDI products and target product

niches within this market, such as token-ring concentrators, that are likely to be neglected by their larger rivals.

To ensure their survival and increase customer confidence in their longevity, these companies said they will also work with the larger system vendors as subcontractors and offer complementary FDDI products.

While this strategy seems sound, companies such as IBM and DEC are not likely to let the current players keep the backbone connectivity market to themselves, analysts said. The big guns will pitch their own lines of FDDI bridges and routers.

The systems vendors, which are keeping quiet about their FDDI plans, claim they will have several advantages in the FDDI market: They can provide a single point of contact for systems and network components, and they can offer the promise of integrated network management and full support.

Industry watchers have little doubt that the FDDI market will explode during the next few years as the standard is finalized, prod-

(continued on page 12)

INDUSTRY BRIEFS

An Wang, the Chinese immigrant who founded **Wang Laboratories, Inc.** and presided as its chairman and chief executive officer, died of cancer March 24 in Boston. He was 70 years old.

Starting from a Boston storefront in 1951, Wang moved his firm to Lowell, Mass., and built it into one of the world's largest computer companies. Among Wang Laboratories' most significant contributions was the introduction in the mid-1970s of the Wang Word Processing System, which put the power of computing into the hands of the masses.

Wang Laboratories has since fallen on hard times, reporting a \$424 million loss in fiscal 1989. Last month, the company signed a letter of intent to sell its InteCom, Inc. subsidiary in an effort to focus on its core businesses and raise money to reduce company debt.

The Wang family said it plans to retain control of Wang Laboratories. Richard Miller, Wang's president, last week was named Wang's successor. Miller is in the midst of trying to return Wang to profitability.

Vitalink Communications Corp. recently announced a multiyear agreement with **Touch Communications, Inc.** under which Vitalink will incorporate Touch's Open Systems Interconnection routing protocol set in its TransPATH bridge/router systems next year.

Vitalink made some modifications to the Touch software to enhance its TransPATH offerings, a Vitalink spokeswoman said.

(continued on page 12)

AT&T merges calling card with Visa and MasterCard

Single card has no annual fee, other bonuses.

By Ellen Messmer
Washington Correspondent

NEW YORK — AT&T last week unveiled the AT&T Universal Card, a calling card combined with a Visa International, Inc. or MasterCard International, Inc. credit line.

AT&T sees the new venture as an extension of its customer services, and analysts said the combined credit card/calling card will promote customer loyalty and could generate credit transaction traffic over the carrier's network, thereby having a positive effect on AT&T's bottom line.

"We've done our homework," said Paul Kahn, president of AT&T Universal Card Services Corp., a wholly owned subsidiary of AT&T. "Our customers have been telling us they wanted the convenience of a single [calling and credit] card, all without an annual fee."

AT&T is dangling a 10% discount on calls charged to the card, as well as "no annual fee for life" for customers who apply for credit in 1990, as long the card is used once a year.

The card, which carries a variable annual interest rate set initially at 18.9%, also gives the cus-

tomer free collision damage coverage on rental cars and free extension of manufacturers' warranties on purchases.

Although AT&T is marketing the card, it has partnered with Universal Bank, a subsidiary of Synovus Financial Corp., to un-

AT&T is dangling a 10% discount on calls charged to the card, as well as no annual fee.

▲▲▲

derwrite the lines of credit and take responsibility for the banking and bill processing. Another Synovus subsidiary, Total System Services, Inc. (TSS), will provide the bill processing services for the new card.

Universal Bank also will incur the cost of offering the 10% discount on phone calls charged to the card.

AT&T will provide customer services related to the card and

will answer customer inquiries about charge-related issues, credit-related purchases and other card member concerns.

AT&T would not disclose how it will share card-related profits with Synovus, but a spokesman said that as part of the deal, AT&T will be allowed to purchase up to 1.5 million shares of TSS stock depending on, among other things, the number of Universal Cards processed by TSS.

AT&T will first target its own 22 million consumer calling card customers for the new AT&T Universal Card, Kahn said.

Steve Kropper, program manager for Integrated Services Digital Networks and intelligent networks at International Data Corp., a Framingham, Mass., market research firm, sees the offering as a blessing for AT&T.

"I see two synergies, both of which get more minutes on the network for AT&T," he noted. "First, from business and residential customers for whom the tie-in creates loyalty, and the other is that it increases AT&T's chance of winning packet-switched network contracts associated with credit card verification/transaction accounts."

Kropper said that the Universal Card will further solidify relations not only with consumer AT&T telephone subscribers, but also with partners MasterCard and Synovus, both of which are big corporate AT&T telecommunications customers. □

Industry Briefs

continued from page 11

The offering is expected to be targeted at users migrating to OSI that must communicate between OSI and multiprotocol nets, she said.

The technology agreement will allow Vitalink to modify Touch software to work with its other offerings as well.

Vitalink is a Fremont, Calif.-based internetworking company. Touch, which is privately held, is based in Campbell, Calif.

Infonetics Research Institute, Inc. has announced its formation as a San Jose, Calif.-based research and consulting firm focusing on user and vendor network computing issues. Financial terms were not disclosed.

Infonetics Research bought certain market research and consulting assets from Infonetics, Inc., a Santa Clara, Calif.-based market research, consulting and testing firm. Infonetics recently sold its testing laboratory business to LanQuest Group Corp. of San Jose in a separate transaction.

Infonetics Research was founded by Michael Howard, previously a vice-president at Infonetics.

The new firm plans to provide network managers and designers with technology reports and network consulting projects, Howard said. It also plans to provide

published market research to vendors to help them develop effective network products, he said.

Telecom*USA, Inc., the nation's fourth-largest long-haul carrier, has announced plans to sell its **Southland Telephone Co.** subsidiary in Atmore, Ala., to **Rochester Telephone Corp.** for an undisclosed amount.

Southland Telephone is one of the largest independent telephone companies in Alabama, serving about 9,000 access lines in that state and another 3,000 access lines in Florida.

The deal will enable Rochester Telephone to expand its presence in the South. Being the only local telephone company in Telecom*USA's portfolio, Southland Telephone no longer fits into Telecom*USA's plans to focus on the long-distance market, a Telecom*USA spokeswoman said.

Brooktrout Technology, Inc. last week announced it has received \$1.6 million from **Battery Ventures L.P.** in its first round of institutional venture capital financing.

Brooktrout Technology is a Wellesley, Mass.-based maker of voice-messaging and facsimile hardware and software.

The company plans to use the venture capital money primarily for research and development, domestic and international marketing and sales, as well as working capital. □

Users face choices in FDDI mart

continued from page 11

ucts come to market and prices drop (see "Report predicts FDDI hub, adapter prices to plummet," page 11).

Richard Villars, manager of computer networking strategies at International Data Corp., a market research company in Framingham, Mass., said this year's \$26.3 million FDDI market will jump to \$1 billion by 1994.

In the meantime, users eager to start using FDDI have little choice but to turn to smaller vendors.

"We chose Fibronics because they had the first commercial FDDI products on the market," said Yi Tung, an aerospace technologist at the National Aeronautics and Space Administration's Langley research facility in Hampton, Va.

Even after the early bird benefits of going with an existing player begin to wear off, users will still have reasons to approach smaller FDDI vendors, acknowledged Karl Pieper, FDDI group marketing manager at DEC.

Smaller vendors will provide users with niche products that are not profitable enough for larger vendors to pursue. "We'll be going after the larger volume business," Pieper said.

At this point, because neither IBM nor DEC is divulging infor-

mation about what types of FDDI products they will introduce, small vendors are uncertain about the product niches they will tackle.

But Hal Spurley, Fibronics' director of marketing, said there is no doubt there will be many niche product needs. For example, Fibronics plans to offer bridges supporting a data flow control feature that lets network administrators restrict LAN resource access, a feature usually found only on routers and one the big vendors might ignore, he said.

FiberCom Chairman Albert Bender said his company plans to focus on selling high-end FDDI gear. "We'll build extremely fast bridges [and later routers] whose performance can be equaled but not exceeded," he said.

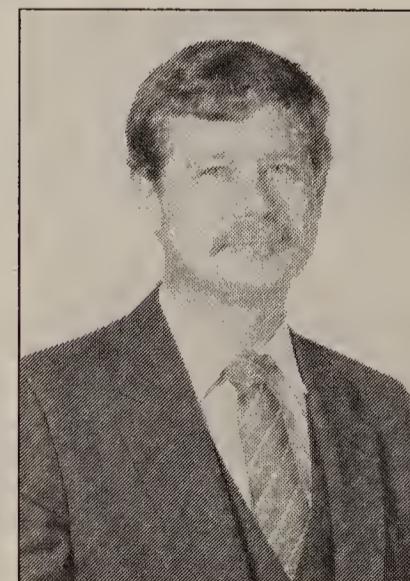
Free of installed base

One attraction of small FDDI vendors is that their product lines are not typically tied to any particular installed base, Villars said. "That means users don't have to be worried about being constrained by the limits of an installed base of products," he said.

Smaller vendors will also generally be "quicker to meet user needs," said David Passmore, a partner with the Network Strategies consulting practice of Ernst

& Young in Fairfax, Va.

To assure users that investing in a small FDDI company is not too risky, the smaller players said they do not plan to go head-to-head with IBM and DEC. "FiberCom can't win by selling 'me too' products," said Bender, whose Roanoke, Va.-based company



Fibronics' Hal Spurley

sold \$2 million worth of FDDI products in 1989.

Among the most important and obvious benefits that systems vendors can offer existing customers is a "high comfort level," Passmore said. Users come to rely on their computer system account representatives, vendor support staffs and technical resources, he said.

Smaller vendors recognize

they need to beef up their sales and support organizations, said John Hale, Fibronics' president and chief executive officer. Fibronics, for example, has doubled its sales force to about 24 people during the past year and is adding to its technical support team. "We've got to try getting

The larger players are expected to be the main source of FDDI-to-the-desktop products.

way to use FDDI, the larger players are expected to be the main source of FDDI-to-the-desktop products.

"Adapters for workstations are more likely to be supplied by the workstation vendors themselves," Pieper said.

Smaller vendors say they are

only focusing a small portion of their research and development dollars on the market for FDDI-to-the-desktop products since that market is not expected to take off for a while.

Given that the FDDI standard is expected to be finalized later this year, the ability of both small and large vendors to comply with the standards and demonstrate interoperability with other vendors' products will be a key decision factor, users said.

According to Barry Reinhold, interoperability lab manager at the University of New Hampshire in Durham, which is currently planning its FDDI strategy, "The bottom line is that the FDDI products have to work together." □

TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

When we debate the future of the telecom industry, we tend to "focus on rearranging the deck chairs on the Titanic rather than looking for icebergs."

Gary Marx
Professor of sociology at Massachusetts Institute of Technology and expert witness on technology and privacy

Carrier Watch

BellSouth Corp. stated in its recently released annual report that the percentage of access lines handled by electronic switches in its nine-state territory edged upwards from 96% in 1988 to 98% in 1989.

The firm plans to complete the conversion to 100% electronic switching by year end. The number of fiber route miles in the BellSouth net rose from 320,000 in 1988 to over 450,000 in 1989.

BellSouth's construction expenditures increased slightly, from about \$3.1 billion to roughly \$3.2 billion. Growth in this area reflects ongoing network improvements.

About 1.46 billion toll messages were placed within BellSouth's 38 calling zones in 1989, a 6.2% increase from the 1.37 billion toll messages in 1988. The number of access lines in service increased from roughly 16.4 million in 1988 to about 17 million in 1989. The installed base of access lines has grown an average of 4% a year since 1985.

Interstate access minutes of use grew from 37 billion in 1988 to 41 billion in 1989, while intrastate access minutes of use rose from 10 billion to 11 billion during the same time period.

BellSouth said improved network efficiency and greater worker productivity, combined with access-line growth, have resulted in a steady decline in telephone employees (continued on page 14)

Census Bureau offers new informational 800 service

Toll-free service designed to ease census task.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — In its effort to account for all U.S. citizens, the U.S. Census Bureau for the first time will use toll-free 800 numbers citizens can use to get information about the census.

The service, which will be provided by MCI Communications Corp., consists of eight 800 numbers answered by operators in English, Spanish, Chinese, Thai, Korean, Cambodian, Vietnamese and Laotian. A ninth 800 number will be specially equipped for the hearing impaired.

The Census Bureau will support between 300 and 400 operator centers in every state. Callers will be able to request census forms, get help filling out forms or make general inquiries about the census effort.

Peter Bounpane, assistant director for the Census Bureau, said the availability of a help line is expected to increase the percentage of citizens responding to the census this year and lower the costs of obtaining information. "This innovative approach to conducting the census should improve the quality and quantity of the data," Bounpane said.

Jerry Edgerton, vice-president of government systems at MCI, said the 800 service will run from March 23 to July 31. During that time, the Census Bureau will direct MCI on how to route traffic to the various answer centers across the U.S. At the end of each day, MCI will supply the bureau

Callers will be able to request census forms, get help filling out forms or make inquiries.

▲▲▲

with an electronic report showing levels of call attempts and completions.

Based on that information, the bureau will be able to reroute traffic to eliminate congestion, Edgerton said.

Edgerton said MCI is prepared to handle almost any volume of traffic on the 800 service but declined to specify what amount the Census Bureau is projecting. □

WASHINGTON UPDATE

Congressman offers RBHC fiber-optics plan.

Rep. Don Ritter (R-Pa.) revealed at a recent conference sponsored by the University of Pennsylvania in Philadelphia that he is planning to introduce a bill that will make it easier for the regional Bell holding companies to migrate their networks to fiber optics.

His vision is to someday have fiber-optic cables running to every home.

Although Ritter did not provide much detail about the bill, an aide said it will likely include provisions such as more rapid depreciation schedules for copper network facilities. It is unlikely the bill would advocate help for the RBHCs in the form of government subsidies.

In his speech, Ritter pitched the bill as a way to encourage RBHCs to maintain and upgrade the local-area network as well as to help the carriers lay the groundwork to offer new services if Modified Final Judgment restrictions are lifted.

Ritter did not say when the bill might be introduced.

Gantos signs up for MCI's Vnet. Gantos, Inc., a Grand Rapids, Mich.-based specialty clothing chain with 140 stores nationwide, last week signed a \$250,000 contract with MCI Communications Corp. for Vnet virtual private network services. The network will enable individual Gantos stores to use a seven-digit dialing plan based on store identification numbers.

A Gantos official said this arrangement would simplify communications among stores and save money. Previously, Gantos used a combination of MCI's Dial 1 long-distance services and Prism Plus. □

Voice mail system market leaders

| Company | 1989 end-user revenues (millions of dollars) | 1989 market share |
|---|--|-------------------|
| Octel Communications Corp. | \$131,272 | 20.33% |
| AT&T | \$87,255 | 13.52% |
| VMX, Inc. | \$65,817 | 10.19% |
| Rolm, an IBM and Siemens AG company | \$54,197 | 8.39% |
| Northern Telecom, Inc. | \$45,066 | 6.98% |
| Applied Voice Technology | \$32,413 | 5.02% |
| Digital Sound Corp. | \$32,312 | 5.01% |
| Genesis Electronics Corp. | \$32,111 | 4.97% |
| Centigram Corp. | \$28,912 | 4.48% |
| Boston Technology, Inc. | \$26,671 | 4.12% |
| Active Voice | \$25,823 | 4.00% |
| Brooktrout Technology, Inc. | \$12,370 | 1.92% |
| BBL Industries, Inc./Glenayre Electronics | \$11,700 | 1.81% |
| Toshiba America, Inc. | \$9,247 | 1.40% |
| Converse Technology | \$8,120 | 1.26% |
| Other | \$42,404 | 6.57% |

GRAPHIC BY SUSAN SLATER

SOURCE: VANGUARD COMMUNICATIONS CORP., SANTA CLARA, CALIF.

Postdivestiture era needs regulatory lead

Conference speakers urge reform, cite need for better management of competition, regulation.

By Anita Taff
Washington Bureau Chief

PHILADELPHIA — Although divestiture introduced competition to the telecommunications industry, some observers say that little has been done since then to manage the industry transition to a competitive marketplace.

Speakers at a telecommunications conference held here last week by the University of Pennsylvania, said it is vital for policymakers to accept responsibility for guiding the industry at this critical time.

Users and vendors, the speakers said, are increasingly frustrated and uncertain about how to operate in a market that is neither totally open to competition nor fully regulated.

"The combination of regulation and competition can be particularly deadly," said Robert Crandall, senior fellow at the Brookings Institute in Washington, D.C. It allows less regulated companies to engage in "gaming," or using the regulatory structure to slow down more regulated providers, he said.

Not only have regulatory rules created disparities in the market, but the problem has been exacerbated by rapidly changing technology and jurisdictional disputes between state and federal regulators, Crandall said. All of this has led to an increasingly fragmented marketplace.

Regulators will be forced to

choose between an integrated, universal telecommunications system held together by regulation or a fragmented, unregulated competitive market, he said.

Ellen Deutsch, a telecommunications attorney who spoke at the conference, agreed that regulators and legislators will have to assess the changes in the industry and try to determine an appropriate role for themselves.

"Historically, the role of the

“T
he combination
of regulation and
competition can be
particularly deadly.”

▲▲▲

regulator was to protect consumers against monopoly providers of service," said Deutsch, who is with the law firm of Thelen, Marlin, Johnson & Bridges in San Francisco. However, since divestiture, the main role of regulators has been to prevent cross-subsidies and to offer a forum for competitors to solve disputes.

The two speakers disagreed on the appropriate approach to take to regulatory reform. Crandall advocates lessened regulation (continued on page 14)

Postdivestiture era needs regulatory lead

continued from page 13

tion. He acknowledged that, "at this point, we have no testable knowledge of whether it is desirable to have [less regulation and the resulting] fragmentation or not."

But Crandall claims there is evidence that regulation discourages innovation and prevents carriers from making full use of new technologies. "Having admitted competition, it seems to me we should look for ways to get rid of regulation," he said.

Crandall said there are valid concerns about the possibility of cross-subsidization if the regional Bell holding companies are given greater freedom, but he said he be-

lieves all interests can be balanced.

Deutsch, however, views continued regulation as the only way to resolve many of the lingering disputes about competition in the industry. "Without regulation, it's going to mean that every one of these issues is going to be litigated," which will be a slow and expensive process, she said.

For example, if the Modified Final Judgment restrictions on the RBHCs are lifted, the whole matter is likely to end up back in court. "Absent regulation, the [RBHCs] would trample on competitors" and there could be more antitrust suits like the one that led to the break up of AT&T, Deutsch said.

"If I were an RBHC, I wouldn't be too anxious to eliminate regulation," she said.

However, if the past is any indicator, it

may be a long time before lawmakers or regulators are able to make progress in freeing the RBHCs from regulation. There

information services, subject to certain safeguards.

But the bill has yet to be formally intro-

Absent regulation, the RBHCs would trample on competitors and there could be more antitrust suits, she said.

▲▲▲

is currently a draft bill sponsored by Rep. Edward Markey (D-Mass.), head of the U.S. House Subcommittee on Telecommunications and Finance, that would allow the RBHCs to enter manufacturing and infor-

duced and follows in the footsteps of several previous bills that were introduced but never made it before the full Congress for a vote. The draft has been heavily criticized by a number of consumer and users groups, as well as carriers and manufacturers.

The Federal Communications Commission has also been working toward greater freedom for the RBHCs, but it is still working on finalizing its Open Network Architecture (ONA) proceeding kicked off two years ago.

ONA, which would specify how RBHCs intend to provide equal network access to competitors offering enhanced services, is a cornerstone of the FCC's efforts to guard against anticompetitive behavior if the RBHCs are allowed to enter currently prohibited markets, said Walter Sapronov, a telecommunications attorney with Bassett, Gerry, Friend & Koenig in Atlanta.

ONA is a necessary step before the RBHCs can enter new business areas, Sapronov said, but the proceeding has been slow, punctuated by a number of contentious issues and an overly complex structure.

Another serious problem facing ONA is resistance from the state regulators who claim the FCC has no authority to impose ONA rules on services that will be offered on a strictly intrastate basis.

For all of these reasons, Sapronov concluded, it will be a long time before ONA is resolved and business restrictions can be lifted from the RBHCs. □

Carrier Watch

continued from page 13

per 10,000 access lines. In 1985, BellSouth averaged about 59 employees per 10,000 access lines. In 1989, the ratio fell to 51 workers.

BellSouth has four main subsidiaries: South Central Bell Telephone Co.; Southern Bell Telephone and Telegraph Co.; BellSouth Enterprises, Inc., the RBHC's equipment sales arm; and BellSouth Services, Inc., which provides planning and support services to the two Bell operating companies.

BellSouth's total revenues rose from \$13.7 billion in 1988 to \$14.2 billion last year. Local service revenues increased from \$5.2 billion in 1988 to \$5.5 billion in 1989.

Access charge revenues and toll revenues both decreased in 1989, access charges from \$3.7 billion in 1988 to \$3.6 billion in 1989, and toll charges from \$1.7 billion in 1988 to \$1.6 billion in 1989.

South Central Bell and Southern Bell serve 70% of the population and 51% of the territory within their regions. South Central Bell serves Alabama, Kentucky, Louisiana, Mississippi and Tennessee, while Florida, Georgia, North Carolina and South Carolina are served by Southern Bell. □



**The
Search
Continues.**

THE ENNE AWARDSSM Honoring The Best Of The Best.

Call, or write for your ENNE Award Nomination Forms today. And salute those who are defining tomorrow.

THE ENNE AWARDS PROGRAM 305 Madison Avenue, Suite 1424, New York, NY 10165 212 983-4965

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

"It's really been interesting over the last year to see IBM recognizing colors in the data processing world other than blue."

Larry Morgan
Senior programmer
IBM General Products Division
San Jose, Calif.

Data Packets

Oracle Corp. recently announced new versions of its SQL*Net LU 6.2 software that will let non-IBM computers running Oracle's data base management system software access data on IBM mainframes using IBM's LU 6.2 peer-to-peer communications protocol.

The new SQL*Net LU 6.2 versions will support LU 6.2 links between IBM mainframes and DOS-based microcomputers, Digital Equipment Corp. VAXes, Data General Corp.'s AOS/VS-based minicomputers and workstations that run AT&T's Unix operating system. Previously, SQL*Net LU 6.2 supported links among MVS-, VM- or AIX-based IBM computers running Oracle DBMS software.

With SQL*Net LU 6.2, Oracle data base applications running on non-IBM systems can access data on IBM mainframes. Likewise, mainframe-based data base applications can access data in Oracle DBMSs on non-IBM systems.

A SQL*Net LU 6.2 version for DOS-based microcomputers, as well as versions for AT&T, NCR Corp. and Sun Microsystems, Inc. Unix-based systems, are currently available. Versions for Hewlett-Packard Co.'s Apollo Division, DG and Motorola, Inc. Unix-based systems, as well as for DEC's VAX and DG's AOS/VS-based minicomputers, will be available within six months.

The new versions of SQL*Net LU 6.2 range in price from \$395 for DOS-based microcomputers to \$80,000 for a VAX 9000 mainframe package.

1989 T-1 multiplexer market share

| Company | Worldwide | U.S. | Non-U.S. |
|---|-----------|-------|----------|
| Timeplex, Inc. | 24.0% | 18.0% | 37.0% |
| Network Equipment Technologies, Inc. | 23.5 | 32.0 | 4.8 |
| Newbridge Networks Corp. | 11.5 | 8.5 | 17.0 |
| General DataComm, Inc. | 7.0 | 4.0 | 13.0 |
| Tellabs, Inc./AT&T | 5.5 | 6.5 | 3.5 |
| Infotron Systems Corp. | 5.0 | 4.0 | 6.8 |
| StrataCom Corp. | 4.3 | 6.0 | 0.0 |
| Codex Corp. | 2.2 | 2.5 | 1.9 |
| Racal-Milgo/Digital Communications Associates, Inc. | 5.0 | 7.5 | 0.0 |
| Avanti Communications Corp. | 1.0 | 1.5 | 0.0 |
| Other | 11.0 | 9.5 | 16.0 |

Percentage of revenue each vendor received from the sale of T-1 multiplexers, intelligent channel banks and network management systems.

GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: ERNST & YOUNG'S NETWORK STRATEGIES, FAIRFAX, VA.

Gov't report says trading nets ripe target for hackers

GAO says exchanges lack adequate safeguards.

By Barton Crockett
Senior Editor

WASHINGTON, D.C. — The U.S. General Accounting Office (GAO) recently issued a report saying that vital trading networks run by the nation's leading exchanges are inadequately protected against hacker intrusions.

The GAO report, which was submitted to the House of Representatives Subcommittee on Telecommunications and Finance in January, only recently became publicly available. The report concluded that the New York Stock Exchange (NYSE), the American Stock Exchange and the National Association of Securities Dealers (NASD) have erected inadequate safeguards to keep employees from bringing down networks that are vital to the nation's financial system.

Although no hacker attacks on these networks have been recorded, the GAO report recommended sweeping changes in the exchanges' operating procedures to increase network security.

"The systems . . . are critical mechanisms used . . . to support our nation's securities trading; they must be held to the highest standards of integrity," the report stated.

The report said GAO investigators had discussed the problems with officials at the exchanges, and the necessary changes had already been made or were planned.

The GAO report focused on three networks deemed essential to the nation's financial system. One is the Common Message Switch (CMS), which is used to

route buy and sell orders from more than 600 brokerage firms to the trading floors of the NYSE and the American Stock Exchange.

The CMS network is run by the exchanges' automation arm, the Securities Industry Automation Corp. (SIAC).

The report also examined the security of the Intermarket Trading System, which is used to route stock trading orders and information between the NYSE, the American Stock Exchange, five regional exchanges and NASD.

Lastly, the report examined NASD's Automatic Quotation network, which is used to distribute pricing information to some 3,000 terminals and supports the country's leading over-the-counter stock trading market.

The report stated that 10 security weaknesses exist at NASD and three at SIAC that "increase the risk of an insider introducing a virus into the networks."

Specifically, the report found that NASD had "an improper separation of duties" among data center staff. It stated that NASD allowed computer operators to perform duties usually reserved for security administrators and gave computer operations staff unrestricted access to production minicomputers.

The report also said that NASD failed to test software for viruses before loading it onto computers. In addition, NASD's "physical security practices did not completely control employees' access to the computer center or their movements once inside the cen-

(continued on page 16)

OSI remains focus for European users

Three conglomerates put their money on the standard as the key to future of communications.

By Paul Desmond
Senior Writer

HANNOVER, West Germany

— Large network users in Europe are breaking ground on ambitious OSI projects to ease communications, not only within their own companies, but also with suppliers and customers.

Users at the Hannover Fair CeBIT '90 show, which ended here last week, spoke with a sense of urgency about Open Systems Interconnection, which is not yet evident in the U.S. The users — Banque Nationale de Paris (BNP), Ford of Europe, Inc. and Hoechst AG — said they are forging ahead with OSI projects in an effort to cut the costs of maintaining proprietary links between different vendors' systems.

"It's vital that we be able to link [incompatible] systems using stable international standards," said Harald Nottebohm, head of the data communications department at Hoechst, a giant German chemical company.

Hoechst is also a member of

OSITOP, a group made up chiefly of user companies. OSITOP monitors the standards-making process for its members, tests products and helps devise migration strategies. Hoechst, Ford and BNP were among nine OSITOP members to participate in an OSI demonstration here during the eight-day CeBIT show ("CeBIT '90 showcases OSI's power," NW, March 26).

Hoechst has a worldwide X.400 network that supports 11,000 employees, including 2,000 in the U.S., Nottebohm said. "But it's not enough. We have 160,000 employees, and only 11,000 are hooked up to the network," he said.

The company needs X.400 because it uses 10 networks based on different protocols and architectures, including IBM's Systems Network Architecture, Digital Equipment Corp.'s DECnet, Hewlett-Packard Co.'s HP Advanced-Net and Transmission Control Protocol/Internet Protocol.

(continued on page 16)

UltraNet pack links Unix workstations to IBM hosts

By Jim Brown
Senior Editor

SAN JOSE, Calif. — Ultra Network Technologies, Inc. said it has recently bundled several UltraNet high-speed network components into a package that can be used to connect Unix-based workstations to IBM hosts at mainframe channel speeds.

The Block Multiplexer Channel network processor (BMCnp) Server Package consists of an UltraNet 1000 hub, host-resident software for IBM mainframes and a series of VME-bus interface boards to connect Unix-workstations to the UltraNet hub.

The BMCnp Server Package enables users to position an IBM mainframe as a file and computational server for Unix workstations and servers. The package will allow users to transfer files between Unix devices and mainframes at 4.5M byte/sec, instead of taking a slower route through a front-end processor supporting Transmission Control Protocol/Internet Protocol software.

It will also let Unix workstations store data on mainframe-at-

tached storage devices, thus eliminating the need to purchase high-capacity storage units for Unix servers.

The BMCnp Server Package enables three Unix workstations or servers to share a single IBM 4381 or 3090 mainframe channel, which operates at up to 4.5M byte/sec. The BMCnp Server Package can be expanded to support additional Unix devices and eight channels on the same mainframe or different mainframes.

The UltraNet 1000 hub, which is channel-attached to the mainframe, supports as many as 14 interface boards and supervises the transfer of data between the mainframe and other devices, including Unix systems.

The hub supplied in the package comes with a BMCnp Single-Channel Adapter supporting connection to one host channel up to 400 feet away. Users can add a \$25,000 BMCnp Single-Channel Expansion board or a \$45,000 BMCnp Dual-Channel Expansion board to the hub to support connection to one or two additional

(continued on page 16)

OSI remains focus for European users

continued from page 15

Twenty-three gateways interconnect parts of the networks, but most are only one-way links, such as a DECnet-to-SNA gateway. That means DEC users can access IBM applications but IBM users can't access DEC applications.

"That doesn't make sense," Nottebohm said.

To remedy that situation, Hoechst is planning to use IBM's File Transfer, Access and Management (FTAM) product as soon as it is released. FTAM would let users access and transfer files between any hosts that support the protocol.

Today, Hoechst's X.400 net is used

strictly for electronic mail, but the company plans to use it for electronic data interchange. Hoechst currently uses the GE Information Systems network to support EDI links with customers and suppliers. With X.400, Hoechst could use its own network for EDI and thus save the cost of the GE Information Systems net.

Toward that end, Hoechst has started projects using the EDI for Administration, Commerce and Transport (EDIFACT) standard with more than a dozen other chemical companies, pharmaceutical producers and wholesalers, according to Nottebohm.

File transfer issues

EDI over X.400 is a hot topic among banks in Europe since banks need to forge

links with hundreds of customers, according to Raanan Barzel, a director at BNP, which is planning to begin its OSI projects this year, starting with X.400 and FTAM.

X.400 will eventually eliminate the need for BNP to forge links between the numerous proprietary computer systems within its own shop and those its customers use.

FTAM is especially important to BNP and other banks that have to deal with European government agencies.

"Now in Europe, the norm is to use FTAM for file transfer" when dealing with government agencies, Barzel said. By contrast, the Government OSI Profile in the U.S. doesn't take effect until later this year.

"Ten percent of our development effort goes to getting different systems to talk to one another," Barzel said. That dispels the argument that OSI software is too expensive since it will actually save money in the long run by cutting development costs, he said.

That's one of the same reasons Ford is forging OSI links with its suppliers, said Glenn James, systems analyst with the company.

"Ford's goal is to move toward an OSI environment," James said. "That's a Ford corporate decision worldwide."

Ford is currently testing X.400 gateways between its Wang Laboratories, Inc. system and the multivendor systems used by its suppliers, including E.I. du Pont de Nemours & Co., James said. □

SIX QUESTIONS ABOUT BRIDGES AND ROUTERS NO ONE ELSE HAS THE GUTS TO ANSWER.

A lot of companies offer you bridging and routing. But they can't answer the kinds of questions Wellfleet can answer. Why?

Because Wellfleet has developed a revolutionary internetworking platform that goes beyond conventional routers and bridges. It answers your need for real world connectivity today, while also responding to the constant growth and change of tomorrow.

Before you buy another bridge or router product, ask these six questions. Then see if anyone besides Wellfleet can give you the answers.

1 Can you support multiple network standards... all at the same time? You need a solution for all your users. So Wellfleet handles all the important networking standards, offering both bridging and multiprotocol routing in an advanced, symmetric multiprocessor platform. With the industry's highest performance for all your network applications.

2 Will you meet my growth needs? Since new applications and users are interconnecting everyday, Wellfleet's platform is designed to deliver consistently high performance... regardless of the number of LANs and protocols supported. A single Wellfleet node can grow to support 26 LANs and 26 wide area links... all

field-expandable by simply adding Intelligent Link Interface boards to our high performance VMEbus architecture.

3 Can you help control my wide area costs? As your applications become more distributed, your wide area costs increase. Wellfleet lets you control these costs by supporting Fractional T1, T1/CEPT, X.25 and high speed private line services. So you can select the mix of services that best meets your network cost, performance and reliability needs.

4 Do you provide integrated management tools? Rapid fault isolation and service restoration

are critical to network success. Wellfleet's SNMP-based Network Management System offers integrated router, bridge and circuit monitoring... a single standards-based management station with an integrated view of the entire network.

And with 24-hour access to our networking experts, you're

5 Can you keep pace with technology? Your users are already planning applications based on new high-speed devices and

evolving network standards. Wellfleet meets these changing needs with the highest performance internetworking platform in the industry today. And with an advanced architecture designed to migrate easily to emerging standards like FDDI and OSI.

6 Are you ready to start today? Call 617-275-2400. Wellfleet is ready when you are. Our advanced internetworking platform is already proven with hundreds of units installed worldwide. Just call us or send the coupon below. Wellfleet is the one company that won't just sell you routing and bridging. We'll offer you the complete answer.

Mail coupon to:
Wellfleet Communications
15 Crosby Drive
Bedford, MA 01730-1401

Please send me complete information on the Wellfleet internetworking platform.

Name _____

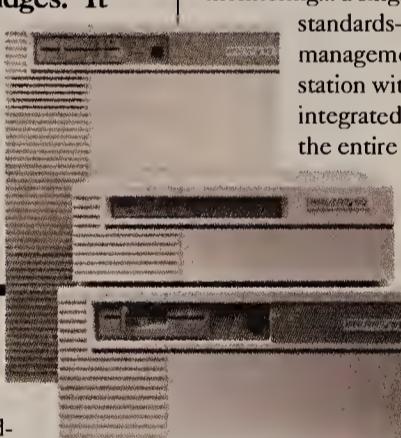
Title _____

Company _____

Address _____

City _____ State _____ ZIP _____

Phone _____



See the FAXNeT Form on Page #38

Trading nets ripe target for hackers

continued from page 15

ter," according to the report.

The report faulted SIAC for not adequately testing modified software for viruses and for not developing a contingency plan to assure service continuation in the event of an outage. The report said the latter oversight was particularly troublesome given that SIAC's backup data center won't become operational until 1991.

The report noted that the vulnerability of these nets to external hacker intrusions is minimal. The reasons for this, the report stated, are that the networks are closed systems that aren't available to the general public; they don't support the transmission of executable computer instructions; messages are received through a series of edit and check procedures that kick improperly formatted messages back to the sender; they use specialized protocols that aren't widely known; and transactions are checked by specialists before execution. □

UltraNet links Unix workstations, hosts

continued from page 15

channels on the same mainframe. Users that want to connect to channels on a second mainframe can outfit the UltraNet 1000 hub with BMCnp Single-Channel Adapters at \$40,000 each or BMCnp Dual-Channel Adapters at \$60,000 each.

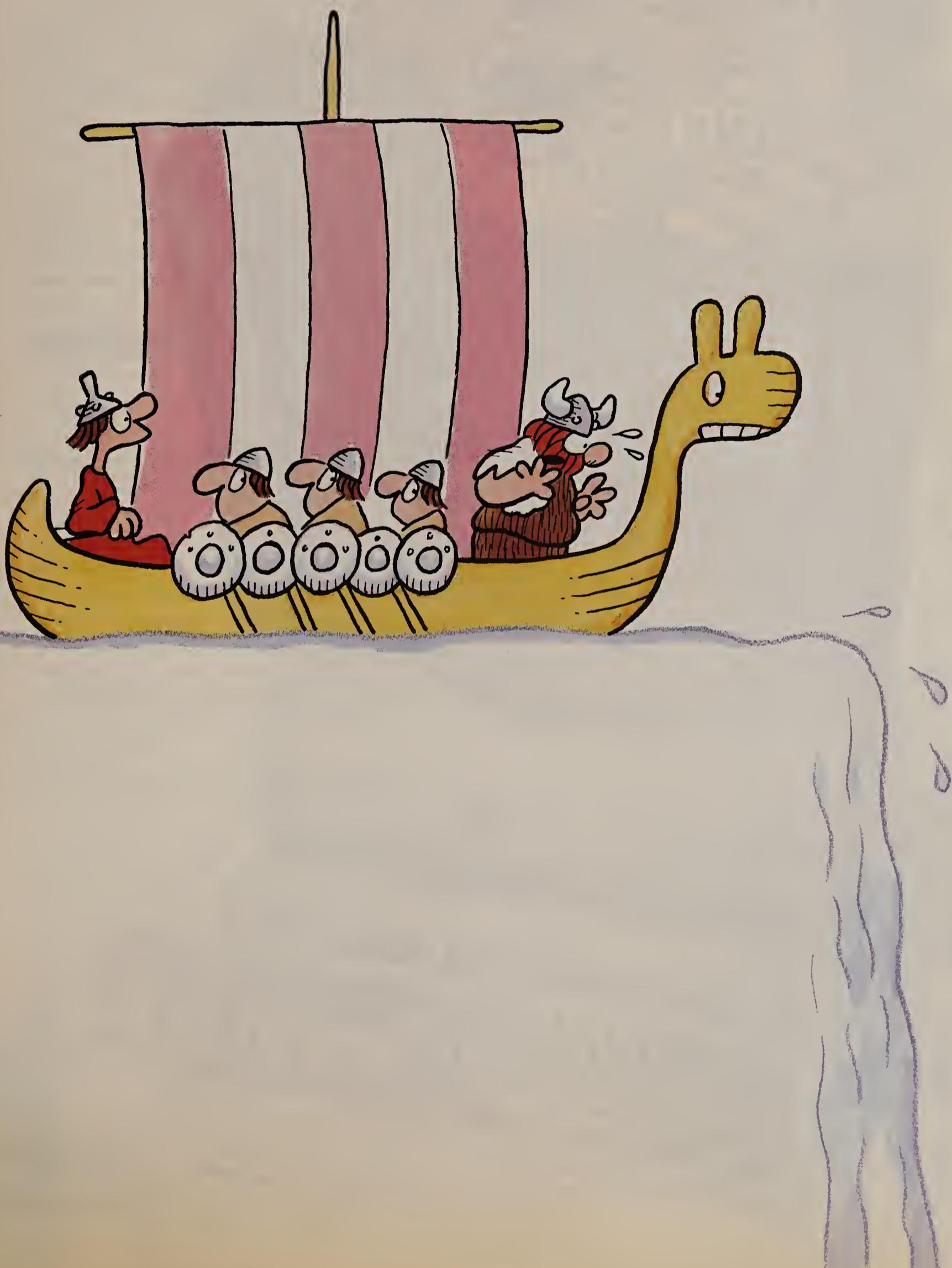
Also included in the BMCnp Server Package are three VME bus-based interface boards that reside in Unix-based workstations or servers. These boards are linked via coaxial or fiber-optic cable to a Link Adapter residing in the UltraNet 1000 hub, which can be up to 2½ miles away. Hub-resident Link Adapters consist of a Link Controller board and up to four Link Multiplexer boards. Each Link Multiplexer board supports four VME bus-based systems.

Unix workstation- or server-based software enables users to transfer data to a port on the Link Multiplexer board. Mainframe-resident BMCnp Software supports the transfer of data from the hub to the mainframe channel.

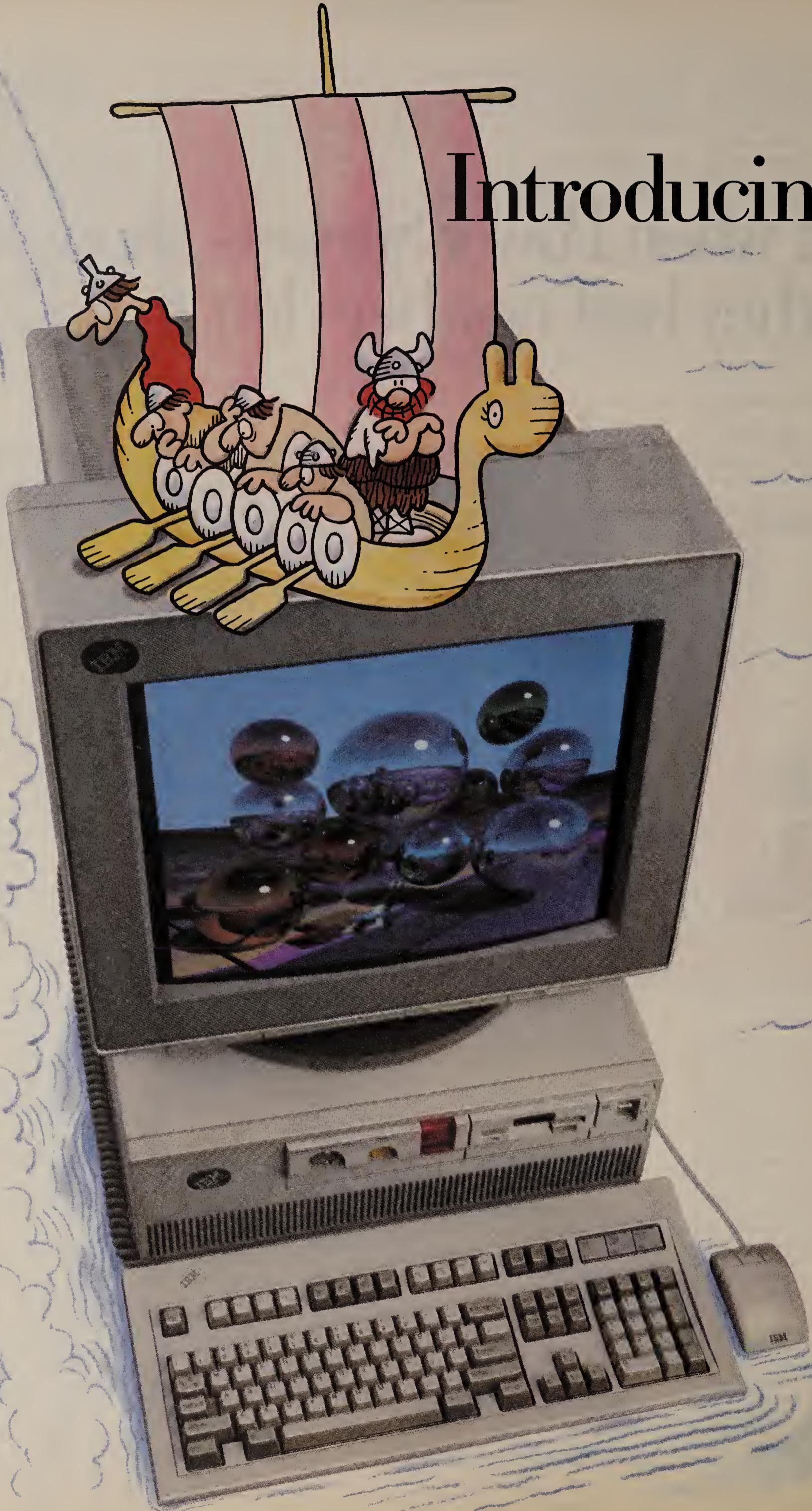
A special BMCnp Software feature, called striping, enables the mainframe to transfer a single file to the hub across eight separate 4.5M byte/sec channels. This effectively increases throughput between the mainframe and hub to 36M byte/sec. The hub then transfers the data to the target device.

The BMCnp Server package costs \$99,000 and is available now. □

Just when Power Seekers thought
they had nowhere left to go...



Introducing the



IBM RISC System/6000™ family.

With the most powerful desktop workstation on earth.

No matter how big the job you're setting off to conquer, the new IBM RISC System/6000 family of POWERstations and POWERservers is for you. The desktop POWERstation 320 puts more than 7 MFLOPS and over 27 MIPS at your command—power that soars as high as 13 MFLOPS and 41 MIPS in other models.

What makes it possible is POWER Architecture—Performance Optimization With Enhanced RISC—IBM's second generation of RISC technology. It delivers up to four instructions per cycle and has the most powerful CMOS microprocessor in the business.

| | MFLOPS | MIPS | SPECmark™ |
|-------------------------------|--------|------|-----------|
| POWERstation 320 [†] | 7.4 | 27.5 | 22.3 |
| DECstation™ 3100 [‡] | 1.6 | 14.3 | 10.1 |
| SPARCstation™ 1 [‡] | 1.4 | 12.5 | 8.4 |

†MFLOPS are the results of the double-precision, all FORTRAN Linpack test 100 x 100 array suite. The Dhrystone Version 1.1 test results are used to compute RISC System/6000 Integer MIPS values where 1,757 Dhrystones/second is 1 MIPS (VAX 11/780). SPECmark is a geometric mean of ten benchmark tests.

‡Performance data are based on published benchmark information.

Micro Channel™ makes bottlenecks ancient history. All RISC System/6000 models feature a new implementation of the IBM Micro Channel bus with I/O throughput of up to 40 megabytes per second. And the Micro Channel Architecture can accommodate a doubling or even quadrupling of this data transfer capacity, making traditional, non-expandable architectures seem primitive by comparison.

Solid support for all UNIX® applications. These systems are all based on the industry-standard UNIX operating system. And they'll run hundreds of applications in such diverse fields as engineering design, fluid dynamics, molecular modeling, securities trading, technical publishing and geophysical modeling, plus a wide selection of commercial applications.

*The POWERstation 320 comes with 8MB of RAM, 120MB of disk, 19-inch grayscale display and graphics adapter, keyboard, mouse, Ethernet™ adapter, AIX operating system, user interface environment, NFS™ and hypertext documentation search and retrieval capability.

A brave new world of 3D graphics. All our POWERstations are built to deliver high-speed, high-resolution graphics. Our 3D processors offer an almost unimaginable palette of 16 million colors. And our new Supergraphics POWERstation 730 gives you 3D graphics capabilities that are really out of this world, performing nearly one million 3D vector transformations per second.

AIX™ brings different worlds together. Every model can come preloaded with AIX Version 3, IBM's version of the UNIX operating system. It supports major industry standards, like POSIX™ and TCP/IP, plus the programming languages C, FORTRAN, COBOL and Pascal. And AIX allows the RISC System/6000 family to fit into your installed UNIX base, as well as your IBM SAA™ environments, giving you the best of both worlds.

Supercomputer speed at a workstation price: \$12,995. Our entry desktop POWERstation 320 starts at \$12,995 complete.* And every member of the RISC System/6000 family comes with software service at no extra charge and a 12-month warranty.

The worldwide support of IBM. Then, of course, there's IBM service when you need it, 24 hours a day, 365 days a year. To find out more, call your IBM marketing representative or Business Partner. For literature, call 1 800 IBM-2468, ext. 225. And find out why it's the beginning of a new world for Power Seekers.

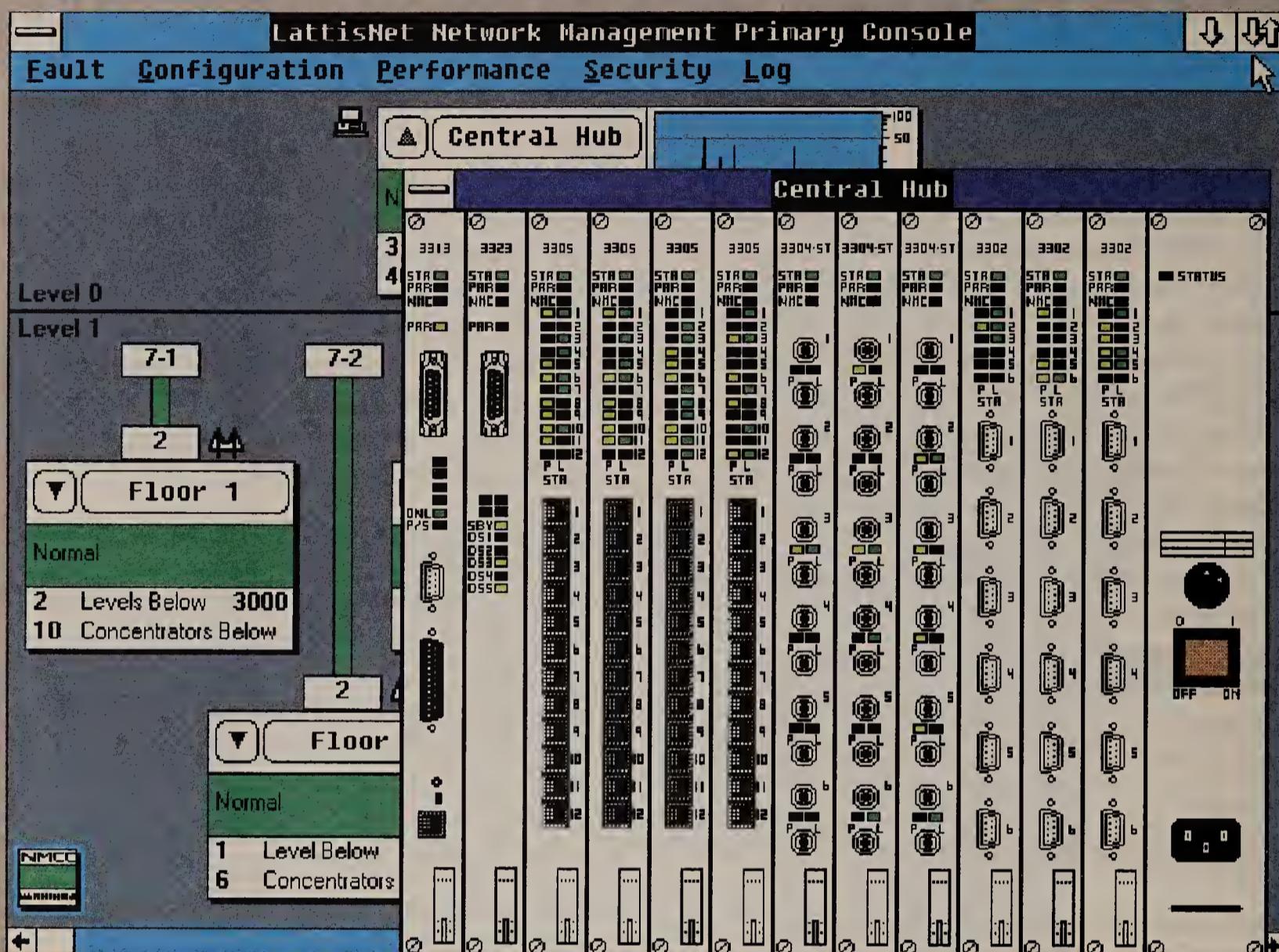


For the Power Seeker.

IBM

IBM is a registered trademark, and RISC System/6000, Micro Channel, AIX, and SAA are trademarks of International Business Machines Corporation. UNIX is a registered trademark of AT&T, Inc. Ethernet is a trademark of the XEROX Corporation. POSIX is a trademark of Institute of Electrical and Electronic Engineers. DECstation 3100 and VAX are trademarks of Digital Equipment Corporation. SPARCstation 1 and NFS are trademarks of Sun Microsystems. SPECmark is a trademark of Standard Performance Evaluation Corporation. HAGAR THE HORRIBLE Character(s) © 1990 King Features Syndicate, Inc. ©IBM Corp. 1990 all rights reserved.

MAXIMIZE NETWORK UP-TIME



The expanded view features a detailed, real-time display of a LattisNet System 3000 concentrator.

IN REAL TIME.

The LattisNet Network Management system lets you maximize network up-time by monitoring, controlling and planning your network's physical layer – in real time – from a central control console. LattisNet Network Management automatically creates a real-time map of your entire network so you can monitor all or any part of your network at a glance. Network utilization data is updated continuously and built-in diagnostics automatically find and isolate faults, saving you time in troubleshooting and helping you keep your network up and running.

An expanded view feature offers a detailed, real-time display of your LattisNet concentrators, allowing you to manage individual network connec-

tions. Problem segments and nodes can be partitioned from the network to avoid catastrophic failures and maintain high service levels.

LattisNet Network Management lets you learn about the network from the network itself. User-definable thresholds let you determine acceptable activity and error levels for the network. If a threshold is crossed, the system alerts you immediately, keeping you one step ahead of potential problems. And best of all, LattisNet Network Management captures and stores vital information for future analysis and network planning.

SynOptics
Communications, Inc.

To receive a free LattisNet brochure and storyboard diskette, call toll-free (800) PRO-8023, extension 2630.

SynOptics Communications, Inc., Dept. 600, 501 East Middlefield Road, Mountain View, CA 94043-4015 (415) 960-1100
© 1989 SynOptics Communications, Inc. LattisNet is a registered trademark and SynOptics is a trademark of SynOptics Communications, Inc. Other brand and product names are trademarks or registered trademarks of their respective holders.

MCI.
Sending
data
your way.



Our plug for data.

Connectivity.

The world's most modern telecommunications network is also the most flexible. While other networks restrict the kinds of data communications equipment you can use, MCI® accommodates it all.

MCI supports more than 900 makes and models of equipment. And our engineers pre-test each of them in MCI laboratories to determine what's

compatible with the hardware you currently use.

Unlike AT&T, MCI doesn't manufacture hardware. So we're always objective when helping you integrate new equipment into your network.

When you connect to MCI, you'll find out how easy it is to add data services without unplugging everything else.

SENDING DATA YOUR WAY

Top 3 automaker:
Created customized
telecommunications
management
reporting
system.

Top 5 oil company:
Devised completely redundant
high speed
data network.



International
engineering
and construction
company: Maintained
network at peak
performance during
San Francisco
earthquake.

Leading
supercomputer
company:
Built and
installed
high speed
international data
network.



Global financial services company:
Developed and implemented worldwide
private voice/data network.

Top 3 U.S. securities firm:
Launched first wideband data
service to South America.

We take service personally.

Dedicated people.

All the technology in the world is nothing
without people like these to back it up.

As an MCI data customer, you'll have your
own dedicated account team. People whom
independent research rate the most responsive in
the industry.

From network design to site surveys to traffic
analyses, they'll tailor your network to fit the
applications of your business.

MCI teams will install your network on your
timetable, not ours. And afterwards your dedicated
account team will be there not just to maintain your
network, but to keep making it work harder for you.
We're doing it for the companies above and other
businesses where data is critical to their operations.

There are lots of places to find nodes, packet
switches, and T-1 multiplexors, but only MCI has
MCI people.

SENDING DATA YOUR WAY



Going places with MCI.

International.

MCI's network for data and messaging services reaches over 250 different countries and territories. More than AT&T. In fact, MCI® has more overseas private lines than any other U.S. long distance carrier.

Through our alliance with British Telecom International and Kokusai Denshin Denwa, MCI is sending customized voice, data, and facsimile between the United States, the United

Kingdom, and Japan.

What's more, we're partners in INFONET, a worldwide leader in packet-switched networks. MCI is utilizing their vast experience in working with foreign PTT's to provide you with even greater data capabilities than ever before.

The MCI Data Network. The network that lets you take on more of the world.

SENDING DATA YOUR WAY

100001101101111100
10110110110111110
010110001011101001
11011101100011011011
1111000011100000111
011001101100001100
01011001001100000
011000100111000001
110000011011101100
11011001001100000
01110000101001100
010110011101000010
01001001100111010
00111000010010000
001101 Let's 10000
011011 101101 talk data.

MCI Digital Data Network.

MCI[®] has invested over \$7 billion to build the world's most modern telecommunications network. And the MCI Digital Data Network (DDN) is an integral part of it. It's an exclusive, all-digital network engineered and maintained to the most exacting standards in the world.

MCI built reliability into every mile of the DDN. Digital Cross Connects automatically choose the most efficient path possible for your traffic. So you're assured of 99.7% availability, end to end. And

Extended Superframe Format monitoring lets MCI specialists correct problems before they affect your data communications. So you're guaranteed 99.5% error-free seconds.

The intelligence designed into the DDN lets MCI offer you customized services for any application you have. From high volume batch data transfers to time-sensitive database updates. At speeds up to 45 Mbps.

The MCI Digital Data Network. When you want to talk data, talk to us.



Let us show you.®

For more information about MCI Data Services, contact your MCI Account Representative or call
1-800-888-0800.

© MCI Communications Corporation, 1990.

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

"I estimate that 90% to 95% of all DEC VAX users also have IBM machines installed at their sites. Invariably, one of the first priorities of VAX users is how they can connect to the IBM environment. The DEC/IBM interconnectivity market is crucial to Digital."

Jane Brewer
Marketing manager
IBM Office Interconnect products
Digital Equipment Corp.
Littleton, Mass.

Netnotes

PowerCore, Inc., developer of Network Scheduler II, and **Consumers Software, Inc.**, developer of The Network Courier electronic mail software, recently announced an agreement to make Network Scheduler II the group scheduling standard for Network Courier.

Combining the products will enable users to access both scheduling and E-mail through Network Scheduler II's 4K-byte terminate-and-stay-resident module. This allows users to switch between Network Scheduler II and Network Courier with one keystroke.

PowerCore joined with Consumers Software because Network Courier will give Network Scheduler II connectivity to environments based on X.400, Systems Network Architecture Distribution Services/DISOS, Simple Mail Transfer Protocol and IBM's Professional Office System, PowerCore said.

Network Scheduler II for Network Courier is available now and costs from \$695 for eight users to \$2,795 for 150 users.

For more information, contact PowerCore at (815) 468-3737 or Consumers Software at (604) 688-4548.

School's beta-test course brings in advanced gear

Creative idea helps students, vendors, budgets.

By Laura DiDio
Senior Editor

CORVALLIS, Ore. — It's no secret that small and midsize colleges and universities often lack the necessary funds to purchase state-of-the-art computer and networking equipment.

But Oregon State University's College of Business here has devised a creative way to acquire the latest high-tech gear free or at discounted prices.

Last semester, the business school began offering what is believed to be the first accredited course in beta-testing computer and networking products, according to Greg Scott, computing services manager.

The university is no stranger to the world of beta testing. Since 1987, the school has beta-tested about a dozen hardware, software and network products, including Novell, Inc.'s NetWare 386.

Scott would regularly visit a group of eight target vendors in key technology markets — including Novell, Microsoft Corp. and Hewlett-Packard Co. — to try to get them to offer deals on products in exchange for the right to beta-test equipment at the school.

Based on its early success as a beta site, Scott, who did most of the beta-testing with the aid of an

assistant, began establishing a plan to put the beta-test lab in the hands of the students.

"Our beta-test efforts were becoming too much for us to handle," he said. "There were just too many products to manage and still keep our LANs up and running." The college's Access Computing Laboratory has 135 Intel Corp. 80286- and 80386-based personal computers.

Last summer, Scott hit upon the notion of involving students in the test program as part of an accredited course for the 1989 fall semester.

The assignment for the initial class of four students was to alpha-test Microrim, Inc.'s Rbase 3.0 software, a fourth-generation language relational data base, to see how it worked on a NetWare test local-area network. In alpha-testing, the students were asked to focus on the viability of the user interface. The class requires students to spend a minimum of three hours a week testing products and to submit weekly written reports to Scott on the week's activities and findings.

All testing is done on the LAN. Although the college is working to forge beta-test relationships with a number of net operating system vendors, so far it has only

(continued on page 22)

Interlink launches entry into bridge, router marts

By Susan Breidenbach
West Coast Bureau Chief

FREMONT, Calif. — VAX-to-mainframe gateway specialist Interlink Computer Sciences, Inc. recently moved into the bridge and router markets with the introduction of three aggressively priced products.

The products, a bridge and two bridge/routers, are designed to connect remote Ethernets to local- or wide-area networks. They were unveiled along with a network management system based on the Simple Network Management Protocol (SNMP).

Separately, the company also announced that it has acquired the leading Transmission Control Protocol/Internet Protocol-to-MVS integration product on the market — Advanced Computer Communications, Inc.'s (ACC) ACCESS/MVS software. The acquisition includes marketing rights to the product, the pro-

gram code, contracts with existing customers and the product's development and support staff.

"We want to leverage our position as a premier SNA gateway company and offer our customers one-stop shopping for their inter-networking needs," said Andrew Henderson, sales manager for LAN technologies at Interlink, an IBM Business Partner.

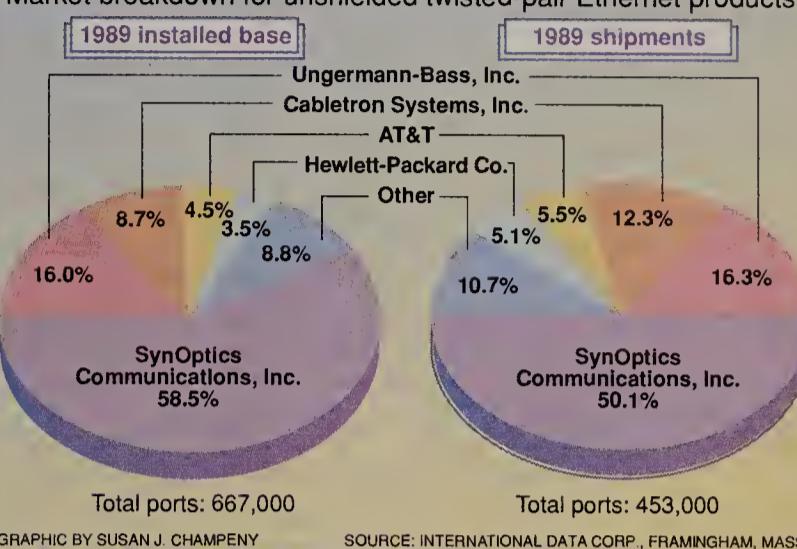
At the low end of the new bridge/router product line is the Software Network Solution (SNS)/B320, a bridge that can be used to link dispersed Ethernets into a single extended LAN. The bridge operates at the media access control layer and can connect LANs running incompatible protocols, such as TCP/IP, Digital Equipment Corp.'s DECnet, Xerox Corp.'s Xerox Network Systems or Novell, Inc.'s Internetwork Packet Exchange (IPX).

However, the SNS/B320 also

(continued on page 22)

Users flock to twisted-pair Ethernet hubs

Market breakdown for unshielded twisted-pair Ethernet products.



GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Document locator spans enterprise nets

Document management system helps users locate files in enterprise-wide net of LAN servers.

By Susan Breidenbach
West Coast Bureau Chief

FAIRFAX, Va. — Trying to locate a document in an enterprise-wide network of LAN servers when the location and name of the file is unknown can be like looking for a needle in a haystack.

To address this growing problem, Network Management, Inc. (NMI) recently introduced a local-area network-based document management system that runs under Novell, Inc.'s NetWare and can be distributed across multiple servers.

Called LANfolio, the product can be used to create a single library index of documents accessible to users on any LAN. The document files handled by the system can be created in any type of application, including word processors, spreadsheets, data bases and images.

Users can search for files via a variety of criteria, such as document name, document owner or author, document type, key words and date of origin. Full-text searches for character strings that were not pre-designated as key words are not supported yet but are a planned enhancement.

"There are other LAN-based document management products out there that do a lot of what LANfolio does, but they don't support hundreds of people or operate across WANs," said Paul Hunt, director of software development for NMI.

Based on the client/server model, LANfolio is broken into two pieces: a back end that runs on the server and a front end that runs on DOS workstations on the

network. There is also a utility that helps the net manager install and configure the document management system.

The back-end program, called the Document Request Server (DRS), runs on the server as either a NetWare Loadable Module under NetWare 386 or a Value-Added Process under NetWare 2.1X. The DRS relies on a relational data base, such as NetWare SQL, that is based on IBM's SQL and contains descriptions of all the documents on the wide-area network being managed by LANfolio.

Each LAN that is participating in the wide-area document management system contains its own DRS and document description data base. Document queries go first to the local DRS, which in turn queries the local data base. If there is no match, the DRS broadcasts the query to other DRSs in the WAN.

The front end is a DOS program that runs in the client workstation and enables the user to search for and retrieve documents from anywhere on the WAN.

The client piece has a Document Profile Screen that displays fields into which the user enters information about the document being sought. The field names can be altered or added to by the system administrator as necessary.

The user fills in one or more fields with search criteria and gets back a list of matches from the document description data base. The user can then zoom in on the individual items on the list

(continued on page 22)

CompuServe Mail service to support Action's MHS

Widens reach of MHS-compliant message tools.

By Walter Sweet
West Coast Correspondent

PALO ALTO, Calif. — Action Technologies, Inc. recently announced that CompuServe, Inc. has agreed to support the company's Message Handling Service (MHS) technology on its CompuServe Mail service.

MHS support will enable users of MHS-compliant products to exchange messages with the more than 500,000 subscribers to the CompuServe Information Service.

From within existing MHS applications, CompuServe users will be able to access CompuServe electronic mail, telex, facsimile and postal services as well as Internet and MCI Communications Corp.'s MCI Mail. It will also enable MHS-compatible LANs to exchange messages with one another by using CompuServe as a store-and-forward service.

"We expect this service to play a significant role in accelerating growth of MHS usage," said Tom White, president of Action Technologies. White said he expects the number of MHS users — bolstered in part by the CompuServe connection — to grow fourfold during the next two years.

Analysts and customers agreed, saying the announcement could spur the use of MHS.

Interlink enters new markets

continued from page 21

has a protocol precedence feature that facilitates the movement of time-sensitive protocols, such as Digital Equipment Corp.'s Local Area Transport, across large-scale WANs. When this feature is activated, the bridge checks packets for such protocols and prioritizes the order of packet transmission accordingly.

The bridge implements the IEEE 802.1 Spanning Tree Algorithm to solve the problem of loops in complex internets. Spanning Tree Algorithm eliminates loops, which arise when there are multiple path options between two points, by selecting the best path and disabling the others.

The next step up the product ladder is the SNS/BR340, a bridge/router that routes DECnet or TCP/IP packets and bridges everything else. When functioning as a bridge, it has all the features of the B320. But the BR340 also has IP routing software that enables the unit to isolate remote TCP/IP Ethernet LANs.

The bridge/router can be user-configured to bridge across links where protocol transparency is the priority and to route where path control is critical.

The messaging technology is already bundled into Novell, Inc.'s NetWare and supported by more than 40 software applications from companies such as Ashton-Tate Corp., Lotus Development Corp. and WordPerfect Corp.

An estimated 750,000 LAN users have some MHS-compatible nets and applications in place, but analysts question whether the majority of these users are utilizing the MHS facilities.

Torrey Byles, a consultant with Input, a market research firm based in Mountain View, Calif., said, "It's definitely a good move for Action Technologies. CompuServe can be the backbone to all the MHS LANs out there." According to Byles, CompuServe's joining forces with Action Technologies is a vote of confidence for both MHS and Action Technologies.

"CompuServe has a history of making very practical moves," he said. "Their moves have been very pragmatic and successful. Going with MHS to provide this backbone carries a lot of force and is a big boost to Action."

Action Technologies' announcement prompted comparisons between MHS and X.400, the official store-and-forward standard for Open Systems Interconnection networks.

Both the B320 and BR340 are based on Interlink's LAN 1000 hardware, which supports either standard or thin coaxial cable Ethernet LANs and X.25 or point-to-point wide-area links operating at speeds ranging from 9.6 to 2M bit/sec.

Users can start out with a simple bridge and then change it to a bridge/router via a software upgrade, which can be downloaded to the LAN 1000 across the network.

Interlink's third new product is the SNS/BR380, which is designed to act as a hub connecting several central hosts to a number of remote LANs or WANs. It is based on the company's eight-port LAN 1020 hardware, which is actually four LAN 1000s rack-mounted in a single chassis.

The BR380 has all the features of the B320 and BR340 and can be connected to both of them remotely. All three internetworking products can function as SNMP agents.

To manage these and other vendors' SNMP-compliant devices, Interlink also introduced the SNS/SNMPconnect, a network management system based on Sun Microsystems, Inc.'s SPARCstation. The SNMPconnect system polls SNMP agents scattered across a complex TCP/IP

BYLES said X.400 is designed for large companies and is overkill for smaller firms. He said last week's announcement will give MHS a better footing to serve the smaller companies that do not find X.400 practical.

"Because MHS doesn't have the X.400 network features, CompuServe comes in to provide those," Byles said. "It's a good pairing for the two. In the push toward X.400, this stands out as a much more practical way of interconnecting company networks."

"X.400 is a nice idea, but there's no one answer for networks," he continued. "Fortune 500 companies can afford an

W hite expects the number of MHS users to grow fourfold in the next two years.



X.400 backbone, but I think smaller companies would use Action/CompuServe."

The MHS/CompuServe connection will be available in mid-May. Pricing has not been set.

MHS Tools

In related news, Action Technologies also unveiled MHS Tools, a group of programs designed to help people use MHS. MHS Tools consist of Remote Ad-

ministration Services, MHS Redirector, MHS Librarian and MHS Bulletin Board. Each is sold separately.

Remote Administration Services allows a network administrator to manage a distributed MHS net from a central location. Network managers at the home office can add users to and delete them from remote systems in addition to making other changes.

Scheduled for release this summer, the tool is priced at \$2,500 for central installation and two remote hosts, and \$995 for each five additional hosts.

MHS Redirector lets users redirect and copy electronic mail to assistants and other users within and between a LAN. This frees up time for busy network managers and saves the time it takes to forward messages manually. The Redirector will be available in May at a cost of \$500 for the first 10 users and \$195 for each additional group of 10 users.

The MHS Librarian will allow users on an MHS network to establish a centrally monitored library where they can store, retrieve and read data. Available in June, the Librarian is priced at \$500 for the initial 10 users and \$195 for each additional 10 users.

MHS BulletinBoard, the first bulletin board for MHS, allows network managers to establish distribution lists for various topics and automatically route messages about those topics. BulletinBoard will be available this summer for \$500 per each 10 users.

ministration Services, MHS Redirector, MHS Librarian and MHS Bulletin Board. Each is sold separately.

Remote Administration Services allows a network administrator to manage a distributed MHS net from a central location. Network managers at the home office can add users to and delete them from remote systems in addition to making other changes.

Scheduled for release this summer, the tool is priced at \$2,500 for central installation and two remote hosts, and \$995 for each five additional hosts.

MHS Redirector lets users redirect and copy electronic mail to assistants and other users within and between a LAN. This frees up time for busy network managers and saves the time it takes to forward messages manually. The Redirector will be available in May at a cost of \$500 for the first 10 users and \$195 for each additional group of 10 users.

In the initial release, this routing process must be done manually; each user receiving a document for some action has to designate the next recipient of that document.

In a subsequent release, users will be able to automate this routing process so that a certain type of document will automatically follow a certain route from user to user through the organization.

LANfolio can track the amount of time particular categories of users, such as secretaries, editors or attorneys, spend doing various types of work on a particular document. This information can then be used for client billing.

The system also contains sophisticated archiving capabilities that can help prevent nonactive files from accumulating and degrading data base performance. LANfolio can be configured to identify documents that have not been accessed for a certain period of time, and can automatically archive them and their associated document description data base information.

LANfolio for NetWare is scheduled to be available in June, and a version that runs under Banyan Systems, Inc.'s VINES and uses Gupta Technologies, Inc.'s SQL-Base data base engine is to follow a little later in the year. Pricing has not been established, but the back and front ends will be licensed on a per-server and per-workstation basis, respectively.

Locator spans enterprise nets

continued from page 21

to determine which corresponding documents should actually be checked out.

When a document is located, LANfolio automatically loads its associated application into the requesting workstation so the file can be displayed to the user.

LANfolio can be used to take contracts or other documents that have to go through a multi-step approval process and route them from user to user across a WAN. Similarly, copies of a document requiring different actions by several individuals or departments can be broadcast simultaneously to the target clients so that tasks can be performed in parallel.

In the initial release, this routing process must be done manually; each user receiving a document for some action has to designate the next recipient of that document.

In a subsequent release, users will be able to automate this routing process so that a certain type of document will automatically follow a certain route from user to user through the organization.

LANfolio can track the amount of time particular categories of users, such as secretaries, editors or attorneys, spend doing various types of work on a particular document. This information can then be used for client billing.

The system also contains sophisticated archiving capabilities that can help prevent nonactive files from accumulating and degrading data base performance. LANfolio can be configured to identify documents that have not been accessed for a certain period of time, and can automatically archive them and their associated document description data base information.

LANfolio for NetWare is scheduled to be available in June, and a version that runs under Banyan Systems, Inc.'s VINES and uses Gupta Technologies, Inc.'s SQL-Base data base engine is to follow a little later in the year. Pricing has not been established, but the back and front ends will be licensed on a per-server and per-workstation basis, respectively.

School's course brings in gear

continued from page 21

beta-tested products on its NetWare 386 LAN. Scott does the actual installation, and then students test the various offerings from their 80386-based HP and AST Research, Inc. workstations.

"In alpha test, we were specifically asking them to report on whether the base functionality was in place and whether the user interface worked," Scott said.

For the 1990 winter term, which began in January, the class

of 10 students are beta-testing several as yet undisclosed Microsoft products and Microrim's Rbase on the NetWare LAN. "This semester, we've got the students looking for bug problems or glitches in the software. It's a brute-force testing process in which they exercise all areas of the program," Scott said.

Spring term begins this week, and this term's beta-testing class has 15 students who will be divided into teams to test a variety of products, including InFocus Systems, Inc.'s color projection system, which enables users to pro-

ject colorized computer monitor images; Consumers Software, Inc.'s electronic mail package; and Computer Support Corp.'s new graphics software package.

"Our students get access to top-flight, state-of-the-art technology so they'll be in a position to play a leadership role in their chosen careers," Scott said.

And, since Oregon State's Business College often mixes and matches application software with specific net operating systems, they often produce results that vendors do not get from other beta-test sites, Scott said.

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS



Dialogue

What is the best April Fools' Day network joke your staff could play?

They could tell me that they managed to get a 640K OS/2 workstation running Novell's Btrieve data base on one window and Oracle's SQL [data base server] on another window.

"At that point, the computer industry would be too bizarre for me.

"I'd probably go open a pet store. I mean, how many versions of kitty litter would come in the front door during a year?"

Rick Segal

Technical advisor
The Aetna Casualty and Surety Co.
Hartford, Conn.

This is dangerous. I could recreate the 1987 stock market crash on our nationwide Macintosh network.

"Our Stratus [Computer, Inc.] processor stores all incoming quote feeds for backup purposes, so we have data from the day of the crash on tape. All I would have to do is throw one switch and we could broadcast quote feeds coming from the Stratus instead of the exchanges to all our traders. You can imagine the reaction.

"Seriously, the danger of systems today is that they are becoming more powerful and it takes less and less people to run them, sometimes only one person. That one guy can really make a big impact. It's spooky."

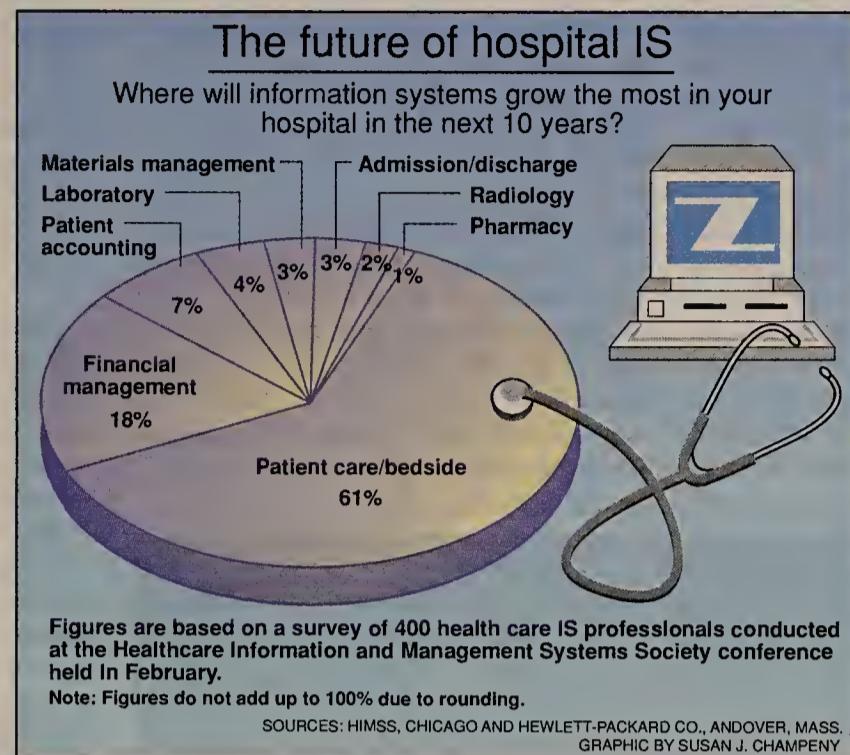
Steve Wood

Telecommunications manager
Hambrecht & Quist, Inc.
San Francisco

They could reverse the video display colors on the personal computer running our network management software to make all our circuits appear as if they were down. Currently, the display has a dark blue background, operable circuits and trunks are shown in green, and downed circuits are shown in red.

"They could screw up me, the data center and the world if they changed the video to red so it looked as if all the circuits were dead and gone."

Greg Crosbie
Director of technical operations
Journal of Commerce
Phillipsburg, N.J.



Health care IS managers concentrate on patient care

Survey shows shift from financial system emphasis.

By Wayne Eckerson
Senior Writer

CHICAGO — A majority of health care systems professionals believe the most important issue facing them in the 1990s is the development of networked patient care systems, representing a shift away from financial systems development, according to a recent survey.

This trend has been driven in large part by efforts to improve the quality of patient care, according to the survey.

"Improving patient care is the primary focus of health care information systems [IS] managers right now," said Richard Rydell, senior vice-president and chief information officer (CIO) at Long Beach Memorial Medical Center in Long Beach, Calif.

Rydell is also president of the Healthcare Information and Management Systems Society (HIMSS), a 4,000-member subgroup of the American Hospital Association based here.

The survey, based on interviews with 400 health care IS professionals, was conducted at a recent HIMSS conference in New Orleans. Eighty-seven percent of those interviewed came from hospitals with more than 250 beds, and 50% were CIOs or heads of IS departments. The survey was commissioned by Hewlett-Packard Co. for HIMSS and conducted by New World Decisions, Inc. of Princeton, N.J.

According to the survey, 61% of those interviewed said patient care and bedside systems will experience the greatest investment growth in the next 10 years, compared to 18% who said financial management systems will grow the most. Patient care systems

support equipment, such as electrocardiographs, that measures and displays patient conditions such as vital signs.

These two areas outpaced gains in patient accounting (7%), laboratory (4%), materials management (3%), admission, discharge and transfer (3%), radiology (2%) and pharmacy (1%) (see chart, this page).

Islands of information

The majority of managers surveyed said their most critical challenge in the 1990s will be to achieve compatibility and full integration among disparate patient, departmental and financial systems.

"Hospital applications tend to be isolated in 'islands of automation,'" said Peter Gladkin, manager of health care IS for HP. "As a result, a patient often has to provide a medical history upon admission, then again down the hall for a lab test and yet again across the hall for an X ray. This creates unnecessary costs for the hospital and inconvenience for the patient."

To achieve this integration, most hospitals appear to be turning to two emerging health care communications standards: Institute of Electrical and Electronics Engineers, Inc.'s standards for hospital automation, known as Medix, and Health Level 7 (HL7). HL7 is an application-level interface for connecting multivendor systems that is being developed by a grass roots organization consisting of industry users, vendors and consultants.

Forty-four percent of those surveyed favor integrating disparate systems using HL7 or Medix

(continued on page 24)

LAN care redefines administrators' roles

Users say LAN growth should cause resource directors to focus on security and data backup.

By Joe Panepinto
Staff Writer

The proliferation of local-area networks and the drastic advances made in LAN server capacity have increased the need for network administrators whose responsibility is LAN security and data backup.

Users and consultants warn, however, that LAN administrators or resource directors should be more than just personal computer fanatics.

They say companies today entrust more mission-critical applications to LANs, so the person overseeing the resources has to be cognizant of procedures for system and information security followed regularly by mainframe administrators.

In the mainframe world, not only are pains taken to physically protect the machines supporting critical applications and data bases, but also MIS administrators typically assign individuals

full-time to the task of data backup and archiving.

Achieving the level of mainframe care in a LAN world is what the LAN administrator position is all about, said John Powers, a consultant with Nelson Communications, Inc. in Waltham, Mass.

"Before PC anarchy took place in the early 1980s, there was a certain discipline an MIS director had within the shop," Powers said. "The confidentiality of information, backup and archiving duties were guaranteed, but we lost it when we went into distributed processing. Many firms won't realize the gaping hole in administrative procedure until they lose valuable information."

Rick Segal, technical advisor at The Aetna Casualty and Surety Co. in Hartford, Conn., and chairman of the newly formed Council for Network Management, said he thinks many LAN resource managers don't appreciate the vulnerability

(continued on page 24)

GUIDELINES

BY BRUCE ELBERT

A surefire guide for network project planning

Making significant changes in a company's communications infrastructure under time and budget constraints takes considerable skill and experience.

While some companies employ specially trained project engineers to handle these tasks, network managers who take on such jobs can ensure the successful conclusion of the projects by using 10 basic principles:

- Assemble a project team of people who can genuinely contribute, and appoint a project leader as early as possible. The team should be small, perhaps four or five people, and have a mix of technical, business and management experience as well as a representative from the user community and a participating vendor, if there is one.
- Select a project planner, preferably someone with experience using project planning software for personal computers. The software will allow the person to lay out the schedules, update them easily and distribute them to key players.
- Issue an organizational chart with business and home telephone numbers.
- Be open to ideas from all people involved. Do not cut corners at the critical starting phase, when ideas are gelling. Allow people to make calls, visit remote sites, and attend conferences and vendor briefings.
- Allow the project leader to resolve differences between two or more people or groups that may have good but differing

(continued on page 24)

Elbert is director of operations for a large communications company and author of several books on telecommunications and information technology.

LAN care redefines roles

continued from page 23

nerability of data traveling on their LANs.

Segal says that, although the LAN resource manager position has evolved to the point where many large information systems (IS) shops have one, it is not a given that LANs will enjoy the same security and backup care shown to mainframes.

"When was the last time you saw a soda can sitting on top of a mainframe?" he asked. Yet an 80486-based LAN server in a regular office environment can provide the same power and storage capacity as some mainframes and minicomputers.

Such carelessness with powerful LAN file servers can make a company vulnera-

ble to losing immense data base files culled from a central mainframe and running on the server, Segal said.

"You want someone in the LAN administrator position who has PC literacy but understands what it means to have a secure system," Segal said. "What you really want is someone to provide the mainframe security blanket without all the overhead."

Segal said there simply has not been enough time to develop mature administrators in the fledgling LAN world. As a result, companies are filling the position with what he calls "PC gurus," whose solution to many net problems is to reboot the system.

"You just don't think of a mainframe getting rebooted," he said. "When it happens, it makes front-page news — bells,

lights and alarms go off. But there is a reset button on the front of every file server."

Michael Peterson, president of Peripheral Strategies, Inc. in Santa Barbara, Calif., said many IS departments have LANs that are too large for a single MIS person to handle. He pointed out that the average ratio of clients to servers on LANs has climbed to nearly 30-to-1, up from 8-to-1 in 1988. That creates an administrative nightmare when end users want gigabytes of data on-line all the time, he said.

"The no-brain answer today is to just keep adding disk drives [to store the data] and not do anything administratively," he said. "But that just makes the problem worse. You simply need to create a network administration position to handle all the information." □

Health IS managers concentrate on care

continued from page 23

standards. In contrast, 26% said they would design custom interfaces to connect islands of information and 13% would acquire a universal translator product. The remainder (16%) said they would scrap incompatible systems and replace them with a single-vendor hospital IS.

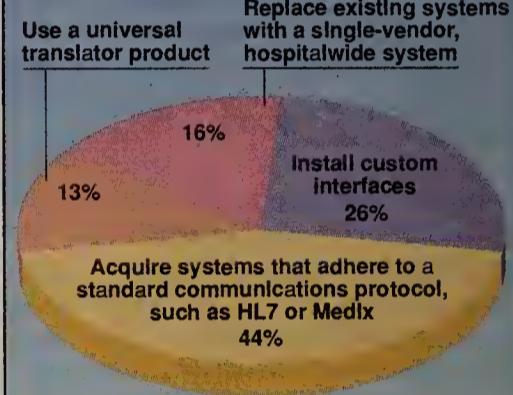
Rydell said HIMSS has been a firm supporter of hospital standards, especially HL7.

This year's HIMSS conference and exhibition, for example, included an HL7 demonstration that simulated a live hospital environment. The HL7 protocol was used to link medical systems from seven vendors ("Conference-goers debate pros, cons of HL7 protocol," NW, Feb. 26).

"Standards will play a key role in helping hospitals link together their departmental systems in an open, hospitalwide network," Rydell said. □

Integrating hospital IS

How will your hospital achieve the goal of integrating departmental systems?



Figures are based on a survey of 400 health care information systems professionals conducted at the Healthcare Information and Management Systems Society conference held in February.

Note: Figures do not add up to 100% due to rounding.

SOURCES: HIMSS, CHICAGO AND HEWLETT-PACKARD CO., ANDOVER, MASS. GRAPHIC BY SUSAN J. CHAMPEY

Bridge Your Token-Ring Networks with Andrew

■ Remote source routing bridges from Andrew connect token-ring networks across the street or around the world at speeds up to 2.048 Mbs. Data compression increases throughput without increasing link speed costs. Andrew local bridges connect 4 or 16 Mb backbone rings to 4 Mb departmental rings.

Source Routing and IBM Compatible

All Andrew source routing bridges offer compatibility with the IBM LAN Manager, NetView and IBM bridges.

Rack Mountable For easy installation, network status, and simplified troubleshooting.

Single Point Bridge Management Easily observe system performance, network status, and configure your network from any designated workstation...worldwide!

The Andrew Token-Ring System includes Multistation Access Units (MAUs), Repeaters and Adapter Cards, providing uncomplicated solutions for your enterprise network needs.

Call us at
1-800-733-0331
ext. 3103

ANDREW

Andrew Corporation
2771 Plaza Del Amo
Torrance, CA 90503

See the FAXNeT Form on Page #38

A surefire guide for project planning

continued from page 23

approaches to solving a problem.

The leader should pick one approach — it doesn't matter which one — and stick with it.

■ Hold regular meetings before the start of the workday. Meet face-to-face, or if that's not possible, set up teleconferences or videoconferences. The more critical the effort, the more frequent the meetings.

If a crisis is looming, hold early meetings — say at 7 a.m. — to provide motivation for people to find solutions that much quicker.

■ Research the pros and cons of each decision, but don't study things to death. There is a time to be decisive.

■ Get key people to sign off on decisions as a way to guarantee their commitment to a particular course of action. This keeps the momentum going.

■ Choose vendors carefully if work needs to be contracted out. Make sure the vendor has the appropriate experience and carefully evaluate its response to a request for proposal.

■ Learn from experience and achieve a high degree of collaboration. There will be times when tempers flare and emotions influence actions.

In this case, huddle with the people involved and reestablish a friendly working atmosphere. □

INTERNATIONAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

Worth Noting

AT&T recently announced it will start supporting international 800 services to Ireland and Grenada later this month, and to India and Bahrain in early May, adding four countries to the current list of 44 in which AT&T supports the toll-free, inbound calling service.

World News

Officials with the Washington, D.C.-based International Telecommunications Satellite Organization, which handles most of the world's international satellite-based communications, said that recent launch difficulties with one of its most advanced satellites will have little or no effect on service.

The satellite, one of five in INTELSAT's newest generation of satellites, was supposed to occupy a geostationary orbit last month over the Atlantic Ocean. Because of difficulties separating the satellite from its booster rocket, however, the satellite was deployed out of position and will plummet back to earth within a year if it is not rescued.

The satellite has the capacity of approximately 23,500 64K bit/sec circuits and at least three television channels. According to INTELSAT officials, it was primarily scheduled to handle on-demand television transmissions and some telephone service, and to act as a backup to other INTELSAT satellites.

INTELSAT officials said that even if the satellite remains out of commission, the outage will have no effect on the availability of international private-line services since the satellite wasn't intended to handle that. Carriers will be able to use other satellites for international calling services, they added. □

West Germany set to allow users to build VSAT nets

Aims to be most progressive in Common Market.

By Barton Crockett
Senior Editor

BONN, West Germany — West Germany's Federal Ministry of Posts and Telecommunications is about to implement new regulations that for the first time will enable users to build very small aperture terminal satellite networks in the country.

Once in place, the regulations will give users their first transmission alternative to terrestrial facilities and increase competition with the country's dominant carrier, Deutsche Bundespost Telekom.

Final comments on a draft version of the licensing requirement for VSAT nets were due by the end of last week.

The government is expected to adopt these new licensing requirements by the end of June, according to Peter Bross, department head for satellite and mobile communications at the Federal Ministry here.

According to Bross, the new licensing system will give West Germany the most liberal regulatory environment for satellite communications in the Common Market ("EC, carriers move toward liberalizing VSAT market," *NW*, March 5).

"We are expecting to become the most permissive country on the continent," Bross said.

According to Bross, the move

to allow VSAT nets in West Germany began last year, when the government implemented major telecommunications reforms that, among other things, removed regulatory authority from Deutsche Bundespost.

The legal speed limit

Included in that legislation was a plank calling for the legalization of interactive satellite networks operating at speeds of 15K bit/sec and slower, Bross said. That speed limit was added to restrict network users from employing VSATs to bypass Deutsche Bundespost's switched voice services. It was thought that the quality of voice traffic carried over 15K bit/sec links would be too poor to be practical for most applications.

In the process of trying to work this rule change into actual network licensing procedures, Bross said the ministry decided to drop the transmission speed restriction. Instead, Bross said the ministry will examine network architectures and applications on a case-by-case basis and decide whether or not the proposed facility will create significant voice bypass.

For example, Bross said private VSAT networks carrying voice traffic only to internal company locations might be allowed.

(continued on page 26)

User tries to cut costs via links over public data net

By Barton Crockett
Senior Editor

HARTFORD, Conn. — United Technologies Corp. is planning to link its Paris and Amsterdam sites over The Dun & Bradstreet Corp.'s public data network to test whether commercial X.25 packet-switching services can be used to reduce net costs without losing valuable network management control.

The diversified manufacturing firm, based here, plans to cut over dedicated local analog lines from its own Sprint Data Group Telenet packet switches in Paris and Amsterdam to Dun & Bradstreet's DunsNet public data network switches in those cities.

The company said it plans to use this arrangement to replace a dedicated long-haul analog circuit connecting the two cities, thus reducing private-line costs.

United Technologies said it expects to complete the cutover by the end of this quarter.

All the way to RS-232 link

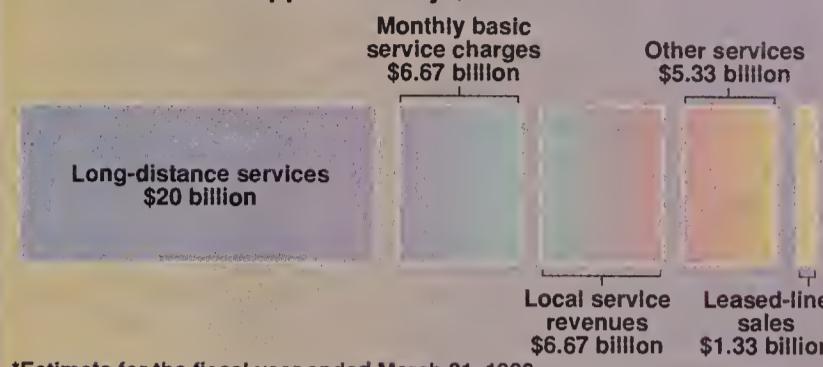
The key to the success of the experiment, however, will be the ability of United Technologies to access advanced network management capabilities through DunsNet. United Technologies relies on advanced features in the network management system for its Telenet switches to manage its current private-line connection, according to James Bailie, international network manager at the firm. "It allows us to see things all the way to the RS-232 connections, which is invaluable," he said.

According to Bailie, most public data network service providers do not give their customers

(continued on page 26)

The Japanese network market at a glance

Total domestic service revenues* approximately \$40 billion



*Estimate for the fiscal year ended March 31, 1990.

GRAPHIC BY SUSAN SLATER

SOURCE: NETWORK WORLD

NTT cuts private-line and long-haul rates

Japanese carrier slashes private-line services up to 26%, cuts long distance 15% on average.

By Lori Valigra
IDG News Service Asian Bureau

TOKYO — Nippon Telegraph and Telephone Corp. (NTT) is turning up the heat in the increasingly competitive Japanese network market by reducing private-line charges up to 26% and cutting standard long-distance costs an average of 15%.

The moves by the domestic carrier, based here, will make NTT's prices more competitive with its three largest adversaries in the switched long-distance and private-line markets and may help NTT stave off market share losses that have dogged it since the inception of competition in 1985.

NTT is looking to slow any further market share erosion in part with price reductions. The carrier plans to significantly reduce digital private-line costs by year end. Specifically, NTT plans price reductions of 26% for 64K bit/sec circuits, 17% for 192K bit/sec circuits and 10% for 384K bit/sec lines. Prices for lines at speeds of 768K bit/sec and up will be reduced 6%.

In some areas, this could significantly narrow the current price gap between NTT and its competitors.

For example, Daini Denden, Inc., NTT's single largest competitor, now charges about \$12,200 per month for a 768K bit/sec circuit between Tokyo and Osaka, Japan, a rate that is 15% less than NTT's current \$14,333 per month.

Daini Denden also charges approximately \$19,667 per month for T-1 circuits between the cities, 13% less than NTT's \$22,667.

Late last month, NTT also reduced standard long-distance calling costs by an average of 15%. For example, the cost of a

standard, three-minute call longer than 320 kilometers during prime daytime calling hours was reduced from about \$2.01 to approximately \$1.79. The carrier also reduced standard charges for three-minute calls longer than 320 kilometers during the early evening from about \$1.21 to \$1.15, and the cost of a three-minute call between 11 p.m. and 6 a.m. from approximately \$1.15 to 96 cents.

With these cuts, NTT's switched, long-distance prices

NTT is looking to slow any further market share erosion in part with price reductions.



now only average 15% more than its three main competitors. Previously, NTT charged rates averaging 25% more than these carriers.

Rivals make sizable inroads

Even though NTT is still by far Japan's most dominant domestic carrier, Daini Denden, Japan Telecom Co. and Teleway Japan Corp. are making sizable inroads. By early 1988, these three carriers had lured away about two million subscribers and were handling about 15% of all calls between the industrial centers of Tokyo and Osaka, according to the market research firm James Capel Pacific, Ltd., based here.

Revenue growth at each of the three carriers has galloped along at about 50% per year since they

(continued on page 26)

NTT cuts private-line, long-haul rates

continued from page 25

began operations in 1985. Currently, according to industry reports, these carriers control 7% to 8% of Japan's switched long-distance service market.

Their increasing market share helped cut NTT's profits by 14% for the fiscal year ending March 31, 1989.

"There is a very bright future [for us] over the next five years," said Haruo Taneno, director at Daini Denden. "The primary problem is recruiting enough qualified people."

For the six-month period that ended last September, Daini Denden, Japan Telecom and Teleway Japan had combined revenues of \$605 million, compared to NTT's

\$20.2 billion revenue for the same period.

Keeping up pressure

With NTT getting more aggressive, executives at the rival carriers are increasing their demands for regulatory changes that would make it easier for them to compete.

"The ministries are very much regulating us now," Taneno said. "We are making constant profits, but [several of] our opportunities are closed."

Specifically, the carriers are arguing for equal access arrangements that will enable customers to use other carriers as easily as they use NTT. Currently, users must dial a four-digit prefix to access any of the com-

peting carriers' networks, something that is not required of NTT subscribers.

Taneno said this extra dialing puts his firm at a big disadvantage compared with NTT. To help ease the difficulty for users, Taneno said Daini Denden and other carriers often install devices that automatically dial the extra four digits. But these devices cost an average of more than \$65 per telephone line, plus more than \$65 in annual installation and maintenance fees. Often, several devices must be installed for business subscribers.

Executives at the competing carriers also complain that NTT charges an extra \$13.33 for installing lines to be used with one of the competing carriers and has a monopoly over service to Japanese pay telephones. □

W. Germany to allow users to build VSATs

continued from page 25

He added, however, that VSAT networks dumping voice traffic into the public network probably will be considered bypass and will not be allowed.

Data applications will be completely unrestricted. Bross said that the West German government will also allow users to own and operate their own international VSAT networks, as long as the country on the other end of the link allows it.

Moving ahead

Meanwhile, U.S. satellite vendors are already gearing up for what they believe could be a major opening of the European satellite market.

Among them is McLean, Va.-based GTE Spacenet Corp., which recently announced that it has begun working with Deutsche Bundespost to sell a satellite service in Europe. The service, called Prepress Express, is already widely available in the U.S.

Prepress Express allows publishing firms to access 56K bit/sec to T-1 bandwidth on demand for satellite transmissions of such materials as page layouts and photos to printing plants.

Prepress Express is not used in Europe, however, because of restrictions on interactive satellite services. But Ray Marks, vice-president of marketing at GTE Spacenet, said his company sees those barriers dropping and is planning to use Deutsche Bundespost as its sole European distributor, not only for West Germany, but for the entire continent.

"We're really excited about the opportunities over there," Marks said. "The whole regulatory environment is changing enormously." □

Gateways to Knowledge



SUPERCOMM® '90 and the International Conference on Communications open the gateways to telecommunications knowledge for you. This conference and exhibition is the world's largest telecommunications event in 1990, and it's absolutely packed with information and products.

You'll have the opportunity to attend 130 sessions — 50 free. Listen to internationally respected industry professionals. Visit 450 exhibits. Examine thousands of products. Network with peers. Hear the latest industry news and views from DEC Chairman Ken Olsen, a special AT&T program, and a carrier/user forum by *Telephony and Network World*. Tour the SUPERHOME and SUPEROFFICE of the future. And get the facts on the most up-to-date technical, operational, and management issues.

Here you'll find more diversity than ever before because the SUPERCOMM '90 Conference and Exhibition is co-located with ICC '90. Renowned for its high-caliber technical programming, ICC brings you a wealth of information under the theme: "Communications — Foundation for the 21st Century."

Attend SUPERCOMM '90 and ICC '90 to step into the future. And to get a step ahead in your career. Call today!



To exhibit:
Telecommunications Industry Association
150 N. Michigan Avenue, Suite 600
Chicago, IL 60601-7524 USA
Phone: (312) 782-8597
Fax: (312) 782-3617
Telex: 595236 USTSACCO

For technical programming:
International Conference on Communications
c/o Southern Bell
675 West Peachtree Street, N.E.
Room 24N73
Atlanta, GA 30375 USA
Phone: (404) 529-7630
Fax: (404) 522-7665

User tries to cut costs via public data net

continued from page 25

the same degree of network management control. But DunsNet, like United Technologies, uses Telenet packet switches, so United Technologies may be able to retain its network management capabilities, he added. Bailie said his firm will work with Dun & Bradstreet to see if United Technologies can control its packet switches by running its own network management system over DunsNet.

"We rely on high-quality network management to help us do our job," Bailie said. "If we can get this same information from the public data network solutions, I don't see any reason why we couldn't begin migrating more of our services over to that."

Europe, Asia first

Among the first locations targeted for migration would be those in Europe and East Asia, Bailie said. He added that United Technologies will look to team up with DunsNet and SprintNet, which also uses Telenet equipment, to supply these services. "What we're trying to do is get the same kind of capabilities with the public data networks that we already have with virtual networks on the voice side," Bailie said. "If we get that, we'll migrate to the public solutions for many of the same reasons people here [are going] with the virtual networking services."

Bailie said he plans to discuss his efforts at an upcoming Telenet Users Group meeting this month in Fort Lauderdale, Fla. □



For registration forms and non-technical programming:
United States Telephone Association
900 19th Street, N.W., Suite 800
Washington, D.C. 20006-2105 USA
Phone: (202) 835-3100
Fax: (202) 835-3248



To exhibit:
Telecommunications Industry Association
150 N. Michigan Avenue, Suite 600
Chicago, IL 60601-7524 USA
Phone: (312) 782-8597
Fax: (312) 782-3617
Telex: 595236 USTSACCO

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Microsoft adds voice messaging to E-mail

Microsoft Corp. last week announced the addition of voice messaging to its version of Microsoft Mail for Apple Computer, Inc. AppleTalk networks. To send voice messages, users must have a Farallon Computing MacRecorder Voice Digitizer, an external voice digitizer and microphone that connects through a serial port, and Sound Driver, software that activates the Macintosh's sound capability.

The user must also add to the local-area network server a "voice form," which enables users to type out an electronic mail message and also append a voice message by selecting a "talk" icon.

The Farallon MacRecorder Voice Digitizer and Sound Driver is available from Farallon for \$149. Registered users of Microsoft Mail Version 2.0 can obtain the voice form free by calling (800) 426-9400.

Microsoft Corp., 1 Microsoft Way, Redmond, Wash. 98052; (206) 882-8080.

FTP Software ports TCP/IP pack to OS/2

FTP Software, Inc. recently announced an OS/2 version of PC/TCP, its Transmission Control Protocol/Internet Protocol software for DOS-based personal computers.

The new product, **PC/TCP for OS/2**, allows OS/2-based personal computers to communicate with other OS/2 personal computers, as well as with different types of computers running a variety of operating systems.

The software, which supports all versions of the OS/2 operating system including IBM's OS/2 Extended Edition, can run on stand-alone personal computers as well as Ethernet and token-ring nets.

PC/TCP for OS/2 supports TCP/IP utilities including File Transfer Protocol and the Telnet virtual terminal protocol. The software also supports OS/2's Presentation Manager, which allows multiple tasks to be executed simultaneously.

PC/TCP for OS/2 software is available now for \$575.

FTP Software, Inc., 26 Princess St., Wakefield, Mass. 01880; (617) 246-0900.

Vitalink, ACC add protocol support to routing bridges

Vitalink offers XNS; ACC has DECnet Phase IV.

By Tom Smith
New Products Editor

Vitalink Communications Corp. and Advanced Computer Communications (ACC) recently bolstered their bridge/router products by announcing support for additional network transport protocols.

Vitalink announced support for four versions of Xerox Corp.'s Xerox Network Systems protocol, as well as plans to support three other protocols in a follow-up release of its software. The new protocols are supported on the company's TransPath 530 and 550 token-ring bridge/routers and its TransPath 350 Ethernet bridge/router.

ACC announced support for Digital Equipment Corp.'s DECnet Phase IV on the company's ACS 4100 and ACS 4400 Ethernet bridge/routers.

Both companies' products previously supported only the Internet Protocol.

The software upgrades allow protocol-dependent routing of a greater number of standard protocols between attached networks. Because the devices also support protocol-independent bridging, they can continue to

connect local-area networks based on nonroutable protocols.

TransPath products now support four versions of XNS: Novell, Inc.'s Internetwork Packet Exchange (IPX), the Apollo Division of Hewlett-Packard Co.'s Domain, Xerox's XNS and Ungermann-Bass, Inc.'s XNS.

The new software will be available in the fourth quarter. Vitalink users with a service plan covering hardware and software updates will receive the software free. It costs \$1,250 otherwise.

Users can reach Vitalink in writing at 6607 Kaiser Drive, Fremont, Calif. 94555, or call (415) 794-1100.

In addition to supporting DECnet Phase IV, the ACC product line will be further enhanced to support DECnet Phase V after that product becomes commercially available.

Users with ACC's software maintenance program can receive the upgrade for free. The cost has not yet been determined for users that are not covered by the maintenance program.

ACC can be reached in writing at 720 Santa Barbara St., Santa Barbara, Calif. 93101, or call (805) 963-9431. □

NMI refurbishes LANware, adds NetWare 386 support

By Tom Smith
New Products Editor

FAIRFAX, Va. — Network Management, Inc. (NMI) recently upgraded its LANware family of Novell, Inc. NetWare local-area network management software products with new features that include support for Novell's NetWare 386.

The company also introduced LANconfig, a new member of the LANware family that maintains net configuration data.

NMI upgraded LANtrack, a performance measuring and diagnostic program; LANtrail, an audit trail program; and LANshadow, a server backup program. Support for NetWare 386 allows NMI users to take advantage of the greater power of NetWare 386. The new NetWare 386 LANware versions are downward-compatible with NetWare 286.

LANtrack Version 2.0's performance monitoring capabilities have been upgraded to allow a net manager to isolate faults by providing information such as which

nodes are generating and receiving bad packets. It costs \$795.

The reporting format of LANtrail Version 3.0 has been revised so net managers for the first time can input audit information into existing spreadsheet or data base programs without reformatting the data. The product costs \$595.

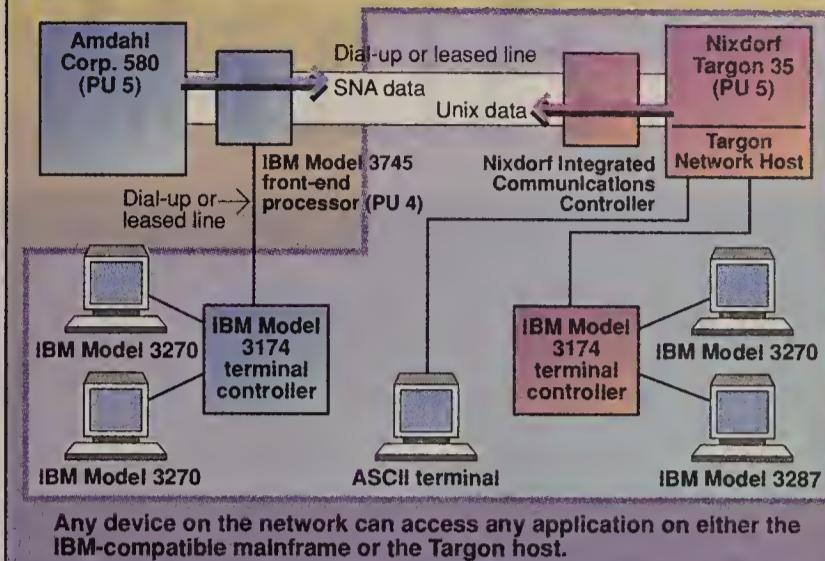
LANshadow Version 3.0 has been upgraded so that it no longer has to run on a dedicated workstation; it will now run on the primary and backup servers. The product is priced at \$695.

LANconfig, which runs on the server, stores information about the configuration of file servers. It also updates software programs, drivers and other equipment throughout the LAN as file servers undergo configuration changes. It costs \$395.

The new LANware releases are scheduled for availability in the second quarter of 1990.

NMI can be reached in writing at 11242 Waples Mill Road, Fairfax, Va. 22030, or call (703) 359-9450. □

Nixdorf's peer link to IBM hosts



Nixdorf package lets mini act as host peer

TNH gives IBM 3270 users access to applications running on firm's Targon 35 superminicomputer.

By Paul Desmond
Senior Writer

HANNOVER, West Germany — Nixdorf Computer AG recently announced software that gives its Unix-based Targon superminicomputer the ability to communicate as a peer with IBM mainframes.

The software, dubbed Targon Network Host (TNH), lets users deploy the superminicomputers in departmental applications, yet still tie them in with Systems Network Architecture applications. Similarly, TNH lets users of IBM 3270 terminals access applications running on Targon hosts.

TNH, announced at the recent Hannover Fair CeBIT '90 show here, runs on a Nixdorf Targon 35 and gives it the appearance of an SNA PU 5 device, which is a mainframe in SNA terms. Previous Nixdorf products let the Targon system log on to an SNA host as a PU 2 device, but an application on a Targon PU 2 node cannot be accessed by other 3270 users in an SNA network.

Manfred Sedello, product manager of communication systems at Nixdorf, said a West German manufacturer will install a beta-test version of TNH in one of its plants this month for manufacturing control applications. He declined to name the company.

In such a setup, SNA users could query the Targon machine from corporate headquarters to extract the data they need, rather than rely on the remote site to send the data.

At CeBIT, Nixdorf had an Amdahl Corp. 580 IBM-compatible mainframe at its headquarters in Paderborn, West Germany, tied to a Targon 35 in the Nixdorf

booth. The 580 supported two IBM 3270 terminals in the booth, while the Targon supported a 3270, a printer and an ASCII terminal, which was linked to the Unix system. Any terminal could access applications on any host.

TNH provides SNA host functionality and connectivity to a Targon system just as IBM's VTAM and Network Control Program — its front-end processor software — provide connectivity to IBM System/370 hosts. That does not mean users can run SNA applications on a Targon host. Instead, TNH implements 3270 presentation services that let non-IBM terminals display data from SNA applications.

Likewise, 3270 terminals will not get the full features of Unix applications, but will be able to display data from a Unix application in a raw format, Sedello said.

Bill Redman, vice-president of Gartner Group, Inc., a Stamford, Conn.-based consultancy, said TNH offers another important feature: It allows Unix users to carry data across an SNA backbone, thus eliminating the need for dual backbones.

But Redman said the product is lacking in the network management sector because it cannot pass alert data to NetView. Instead, Nixdorf provides its own net management system and lets a NetView operator access that system from a 3270 terminal.

Redman also faulted Nixdorf for not having software written for specific lines of business.

TNH runs under Unix Version V, Release 3.2. Sedello said it is scheduled for general availability in the first half of 1991. Pricing has not yet been determined. □

Closing The Gap Between And What Information



Open What Business Needs Systems Can Deliver.



Unprecedented changes in markets, competition, regulations, and technology are changing the way business does business. Those that can react quickly and effectively to these changes will thrive. Those that can't will be lucky even to survive.

Unfortunately, conventional computing strategies aren't flexible enough to handle rapid change. In fact, the gap between what business needs and what such systems can offer is widening.

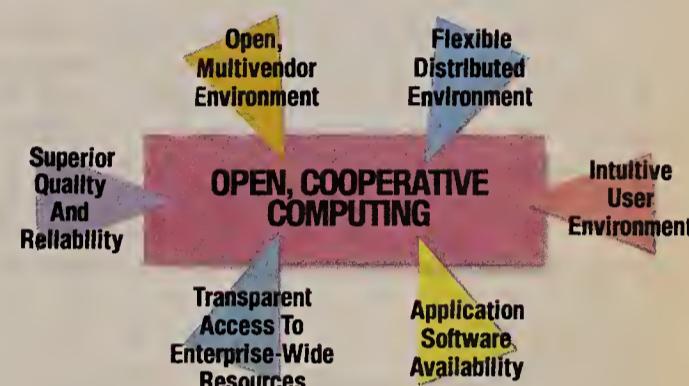
Open, Cooperative Computing is NCR's strategy to help you manage change. It provides an open systems environment that accommodates the widest possible choice of hardware and software. So you can add applications and functionality quickly.

Its client/server architecture lets you distribute computing resources more efficiently. Its intuitive graphic interface gives you transparent access to information enterprise-wide. So you can respond to customer and market needs more quickly and more effectively.

And it provides a bridge to your current information systems that preserves your present investment in systems, applications, and data.

NCR is a leader in open systems solutions. We build the most complete set of end-to-end, industry-standard products. And no one has more experience connecting multivendor environments, via SNA, OSI, and other communications methods.

Open, Cooperative Computing is a strategy that will shape the future of information systems. The time to begin implementing that future is now. For details, phone 1-800-CALL NCR.



NCR

Open, Cooperative Computing.
The Strategy For Managing Change.

OPINIONS

COMMUNICATIONS TRENDS

BY JAMES KOBIELUS

Demystifying the myth of integration

Integration is one of the great million-dollar communications concepts that really missed the boat. It was supposed to be the dominant trend of modern networks, increasingly manifesting itself in all areas — trunking, switching, access, applications and network management — through the magic of digitization and standards.

We are bombarded by technologies and standards that promise new vistas in integration: from Open Systems Interconnection to Integrated Services Digital Network, wideband packet switching and beyond. Each of these is portrayed as some sort of master channel through which all electronic communications will one day flow. To be sure, all are important developments.

But none appears to be the revolutionary technology that will eventually replace all networking schemes — local and long-haul — that came before.

If integration is really the dominant trend, then networks should be getting simpler, more streamlined and consolidated. But the very opposite is true. Many private networks are, in fact, a loosely integrated family of overlapping systems, each supporting a particular application, including voice, electronic mail, asynchronous data, synchronous data, transaction processing, facsimile and videoconferencing.

Ironically, each new "integrated" technology simply makes networking more complex. In many cases, these technologies are implemented in piecemeal fashion, in a particular location or for a niche application, thereby becoming yet another drop in a vast ocean of heterogeneous information and communications systems.

Eventually, most "integrated" technologies will settle into their own comfortable niches, such as ISDN for integrated user access, OSI for heterogeneous internetwork links and wideband packet switching for backbone trunking. Chances are that each will be bypassed ultimately by some new technological claimant to the throne of superintegrator.

In fact, ISDN, which is barely out of the starting gate commercially, is already being dismissed as an obsolete technology. In the minds of network architects, it has already been eclipsed by the new, improved version: broadband ISDN.

All of which goes to show that integration is not a dominant trend in modern communications. New technologies seldom eliminate the old altogether. More often, parallel networks are established and maintained. An older technology may be given a new lease on life through limited interconnections and a redefined role vis-a-vis the young upstart.

The evolution of local-area networks is a good case in point. LANs were developed to bypass the technical limitations of two older data communications technologies: time-shared host computers and data private branch exchanges. LANs haven't eliminated hosts or PBXs, which in some cases become specialized servers on the new network.

Implementing a parallel network to support a new application is the first instinct of most network architects. Most would rather bypass the existing system than force the new requirement to fit into it.

Implementing parallel systems is also inevitable because demands on networks are changing and no one technology can satisfy all the requirements that may someday arise. □

Kobielus consults on information technology in Alexandria, Va.

NETWORK WORLD

Editor
John Gallant
Executive Editor
John Dix
Assistant Managing Editor — News
Charles Bruno
Senior Editors
Bob Brown — Industry Update
Jim Brown — Data Communications
Barton Crockett — International Networking
Laura DiDio — Local Networking
Bob Wallace — Telecommunications
Senior Writers
Paul Desmond — Data Communications
Wayne Eckerson — Management Strategies
Staff Writer
Joe Panepinto
New Products Editor
Tom Smith
West Coast Bureau
Susan Breidenbach — Bureau Chief
(415) 771-3530
Walter Sweet — Correspondent
(415) 771-4103
2088 Union Street, Suite 2
San Francisco, Calif. 94123
Washington D.C. Bureau
Anita Taff — Bureau Chief
(202) 347-6184
Ellen Messmer — Correspondent
(202) 347-4180
650 National Press Building
529 14th Street NW
Washington, D.C. 20045

Features Editor
Steve Moore
Associate Features Editor
Bruce Guptill
Features Writer
Salvatore Salamone
Assistant Features Editors
Alison Conliffe
Susan Collins
Art Director
Dianne Barrett
Informational Graphics Designer
Susan Champeny
Junior Graphic Designer
Susan Slater
Assistant Managing Editor — Production
Beth Khouri
Associate Editor
Joanne Cummings
Copy Editors
Liz Pappas
Michelle Beaulieu
Karen Maierhofer
Assistant to the Editor
Cheryl Tynan
Editorial Assistant
Tracie Seder
Contributing Editors
Daniel Briere
James Kobielus
Joe Mohen
Alan Pearce

President/Publisher
Gary J. Beach
Director of Financial Operations
Mary Fanning

Network World
161 Worcester Road
Framingham, Mass. 01701
(508) 875-6400
MCI Mail — 390-4868
FAX: 508-820-3467

An IDG Communications Publication

USER ADVISORY PANEL

Laurie Bride
Manager, Network Architecture
Boeing Computer Services
Roy Bruce
President
International Communications Association
Al Crawford
Senior Vice-President
American Express TRS Technologies, Int'l
Phillip Evans
Director, Telecommunications
FMC Corp.
Senior Vice-President
International Communications Association
Len Evcenich
Director of Communications
The Commonwealth of Massachusetts
Thomas Festa
President
Wall Street Telecommunications Association
Jan Hackmann
Director of Telecommunications
Multicare Medical Center
President, Tele-Communications Association, Inc.
Michael Kaminski
Manager, CIM/Networking Technologies
General Motors Co.
Jerald Marcone
Assistant Vice-President, Telecommunications
Crum & Forster Corp.
President, Communications Managers Association
Chuck Papageorgiou
Network Administrator
United Parcel Service
Henry Pfendt
Director, Information Technology Services
Eastman Kodak Co.
Kenneth Phillips
Vice-President, Office of Telecommunications Policy
Citicorp
Chairman, Committee of Corporate
Telecommunications Users
William Pomeroy
Director of Telecommunications Public Policy
International Communications Association
Michael Toto
Vice-President, Corporate Telecommunications
Johnson & Higgins
President
Association of Data Communications Users
Stanley Welland
Manager, Corporate Telecommunications
General Electric Co.

EDITORIAL

Network World forms User Advisory Panel

The challenge for any publication is to truly understand the needs and concerns of its readers. To provide useful information, a publication must be aware of the problems its readers are wrestling with and know the questions that are uppermost in readers' minds.

Getting and staying in touch with readers' needs isn't easy. Many new publications fail because they don't establish any real communication with an audience. Even established, successful publications stumble when they lose touch with their readers over time.

At *Network World*, maintaining a rapport with our readers has always been a primary objective.

Understanding readers' needs is fundamental to achieving our editorial mission: to be the most useful source of information for the executives who design, build and operate enterprise networks.

That's why we're pleased to announce this week the establishment of the *Network World* User Advisory Panel. As you can see from the list of names above, the User Advisory Panel is made up of 15 top network executives, representing the leading professional associations in the network industry, as well as most major industries.

The charter members of the User Advisory Panel are some of the most respected leaders in the field of networking.

Members of the panel will provide invaluable information and insights that will be used in shaping *Network World's* editorial coverage. Members' opinions will help us to understand better how we can serve readers. They'll tell us directly how we can improve our coverage.

We will be in touch regularly with panel members to get their views on emerging issues and to develop stories on topics of concern to all of our readers. In

short, the User Advisory Panel will help *Network World* meet the needs of network users week after week.

Formation of the panel complements other reader service efforts that *Network World* has undertaken since its inception in 1986. For example, each year, we conduct quarterly reader surveys designed to sharpen our editorial focus. We also conduct focus group research and bring users into our editorial meetings to learn about their concerns face-to-face. That's what it takes to stay in touch.

Please join us in welcoming the members of the premier *Network World* User Advisory Panel. Our thanks to the network executives who've agreed to work with us on this important endeavor.

With their help, *Network World* will continue to be the most valuable source of information for network executives. □

OPINIONS

REGULATORY POLICIES

BY ALAN PEARCE

Current FCC rules are bad for American business

Alfred Sikes, chairman of the Federal Communications Commission, says the agency must "understand the global implications of its decisions."

In that case, Sikes should immediately review the FCC's many cross-ownership policies that favor foreign-owned conglomerates and Hollywood movie/cable television/publishing consortia, and discriminate against certain domestic companies — namely, the three major TV networks, regional Bell holding companies and independent telephone companies.

The FCC rules in question include:

- The Newspaper/Broadcast Crossownership Rule, which prevents a daily newspaper from obtaining a license for a radio or TV station in the community in which the paper is published.
- The Cable/Broadcast Crossownership Rule, which prohibits ownership of a cable TV system by a TV station with overlapping service areas.
- The Telephone/Cable Crossownership Rule, which says telephone companies are not allowed to own cable systems in their monopoly telephone service areas.

- The Financial Interest Rule, which states that the three major networks — American Broadcasting Companies, Inc., CBS, Inc. and National Broadcasting Co., Inc. — cannot have any financial interest in any program produced by an independent production company that is included in that network's schedule. The rule has been interpreted as preventing the networks from buying or merging with a movie or TV program production company, such as Columbia Pictures Entertainment, Inc.

In addition, a consent decree signed by ABC, CBS, NBC and the Department of Justice limits how many in-house-produced

Pearce is president of Information Age Economics, a telecommunications research firm in Washington, D.C.

shows they can put on the air. This agreement expires late next year, but the three networks are already pushing the government to relax the restraint so they can buy a bigger stake in the Hollywood program production industry.

- The Program Syndication Rule, which stipulates that the networks cannot syndicate, meaning sell to others for profit, any program produced by the independents and aired on the networks. The syndication market is worth billions of dollars annually worldwide. Although they pay for the development of such programs and promote their popularity and value, TV networks are excluded from these profits.

The FCC-imposed restrictions on the RBHCs have been aggravated by:

- The Cable Policy Act of 1984, which not only deregulated cable TV, but also legislatively mandated that phone companies could not own cable TV systems within their service areas.
- The Modified Final Judgment, which prevents the RBHCs from offering information services content.

The original purpose of these rules was to foster diversity of ownership, maximize program and service viewpoints, and prevent undue concentration of ownership. Although the FCC has considered multiple ownership restrictions for cable TV, no rules have yet been adopted. Therefore, cable TV companies can be as large as their financial resources permit.

In addition, there are no restrictions on foreign ownership of U.S. cable TV companies.

The rules now limit the acquisition and diversification prospects of the TV networks and telephone companies while helping the acquisition and vertical integration strategies of foreign-owned companies such as Sony Corp. and cable TV/publishing/TV program production conglomerates such as Time Warner, Inc.

For example, Sony, the Japa-

nese consumer electronics giant, recently plunked down almost \$5 billion to buy Columbia Pictures Entertainment, Inc. from Coca-Cola Co. and other owners. Sony may now buy videocassette retail stores and perhaps even cable TV properties in an attempt to vertically integrate into the U.S. entertainment and information market.

Time, Inc. and Warner Communications, Inc., two of America's largest multimedia conglomerates, have just gone through a \$16 billion merger that combines publishing, TV program and movie production, cable TV, broadcasting and recording interests. The FCC approved the merger because it did not violate the cross-ownership rules. And though Sen. Howard Metzenbaum (D-Ohio), chairman of the Senate Antitrust Subcommittee, expressed concern about horizontal and vertical integration in the cable TV industry, the Justice Department joined the FCC and approved the merger, partly in response, industry observers say, to the fear of foreign domination of the electronic mass media in the U.S. Although foreign ownership in broadcasting is limited to a maximum of 25%, there are no foreign ownership restrictions on cable TV or program production companies.

When the rules in question were adopted — mostly in the 1970s — cable TV was an infant industry and needed to be protected from the power-hungry TV networks and telephone companies. Today, the cable TV industry and the Hollywood movie industry no longer need such protection.

Today's rules should change to reflect today's postdivestiture, multinational business environment. Sikes should heed his own words. He must consider the global implications of FCC policies and do away with outdated rules designed to protect the cable TV and program production segments of the industry from domestic competition. □

IF WINTER COMES, CAN SPRING BE FAR BEHIND? And if spring is nigh, then your column must be coming in the mail sometime soon, too.

Manuscripts should be letter-quality, double-spaced and between 600 and 900 words in length. Disk or modem submissions are preferred.

If you'd like to write a column, call Steve Moore, features editor, at (508) 820-7439 or fax your idea to us at (508) 820-3467.

TELETOONS

BY FRANK AND TROISE

Let's see.. next item on the agenda must be Ralph's overview of international networking in the 1990's



LETTERS

Future looks bright

Contrary to the information in your article "Users lukewarm to groupware products" (NW, March 5), our flagship product, Right Hand Man, has been well received. We believe groupware has a solid future.

In fact, interestingly, the market research company used as a primary source in the article actually suggested to us within the last 30 days that future groupware market share may well go to fully integrated group productivity software, such as Right Hand Man, rather than to single-function electronic mail or group scheduling products.

It's important to remember that for groupware to be effective, user work groups must already exist. This adheres to a basic principle of good office automation and computerization: If you automate a bad procedure, then all you have is a bad automated procedure. A look at the real functional needs of the organization must occur before any groupware purchase.

In our experience, LAN work groups should be defined

by operational or departmental functions, not by sheer geographic proximity. We agree with the implication made in the article that any attempts to corral personal computer users into a work group just for the sake of justifying a LAN purchase is doomed to failure.

LAN users should be able to switch into and out of groupware functions effortlessly, with a single keystroke. Thus, any group productivity software being used or under consideration for purchase must be a true terminate-and-stay-resident (TSR) product. If the product is not a TSR product, then, without a doubt, it threatens to become interruptive or inconvenient to use.

What's even worse — not ing the personal rather than

(continued on page 50)

Network World welcomes letters from its readers.

Letters should be typed, double-spaced and sent to Editor, Network World, 161 Worcester Road, Box 9172, Framingham, Mass. 01701.

Letters may be edited for space and clarity.



The shortest route between two LANs

Source routing offers many options for efficient network design.

CONTINUED FROM PAGE 1
source routing, the complete route is specified when the information enters the network.

LAN addresses

Every workstation, file server or other device on a LAN must have a unique six-byte address. Two high-order bits of the address's first byte have a special meaning. The first and most significant bit, called the I/G bit, distinguishes between individual and group addresses. A station can have both an individual address and group address.

The second bit, known as the U/L bit, distinguishes between universally and locally administered addresses. The Institute of Electrical and Electronics Engineers, Inc. assigns manufacturers unique, universally administered addresses. The header of any frame transmitted on either an Ethernet or token-ring LAN contains the destination address for the station to which the frame is being sent, as well as the source address for the originating station.

With transparent spanning tree bridges, this is all there is to addressing. The transparent bridge maintains and uses address tables to determine which frames are passed across a bridge. With source routing, addressing is expanded to accommodate bridging between multiple LAN segments.

The designers of source routing noticed that the I/G bit in the source address is not really needed. A frame may be addressed to multiple stations that share the same group address, but it can never originate from more than one station. Therefore,

Thiele is vice-president of engineering for LAN products at Andrew Corp. in Torrance, Calif.

this bit, in the source address only, is called the Routing Information Indicator (RII) bit. When the RII bit is set to one, it indicates the presence of additional routing information in the frame header. This additional information can occupy up to 18 bytes, and it specifies the complete path the frame must traverse, from the originating station to its destination.

To completely specify the route that the frame follows, each LAN segment must be assigned a unique number. The routing information is basically just a list of these LAN segment numbers, given in the order in which they are traversed, such as Segment 2 to Segment 9 to Segment 4. Any pair of stations on separate LAN segments can communicate along a path that traverses the segment of the originating station, the backbone segment and the segment of the destination.

In some situations, parallel bridges may connect a given pair of LAN segments. When parallel bridges are used, the route information specifies which one should be traversed by assigning numbers to bridges. These bridge numbers, which need not be unique across the network, are required only to distinguish among parallel bridges.

Source routing

The term "source routing" stems from the fact that it is the transmitter, or source, of the frame that specifies the route that the frame must follow. The source supplies a routing information field that specifies the complete route to the destination. This routing information field is included in the MAC sublayer frame header.

Figure 1 on page 49 shows an example of a routing information field, the first two bytes of which are control bytes. In this format, 12 bits specify the LAN segment, or

(continued on page 49)

We've just dropped a bundle on our T1.5 rates.

So you don't have to.

Did you know that over the past eighteen months we've reduced our T1.5 prices up to 60%? So if you've been thinking that cost was an obstacle to getting high quality, reliable T1.5, think again.

There's more than one way to save with our T1.5. For instance, our Multi Service Volume Pricing Plan gives you volume discounts. So if you use more than one of our ACCUNET® Services, you save even more.

We also offer term discounts for T1.5 and T4.5. If you sign up for five years, you can save up to an additional 29% over regular month-to-month prices.

But we also know that price isn't the most important thing about your network. You need a network you can rely

on. That's why we offer the AT&T Service Assurance Warranty. Because we're so confident in the reliability of our T1.5 and T4.5 services, we'll give you substantial credits if they ever go down. Not one of our competitors gives you that kind of guarantee.

So if you want T1.5 service, with quality and reliability, a new low price and the only warranty that actually pays you for downtime, there's only one place to get it all. AT&T.

*Value.
Another AT&T advantage.*

For more information, contact your AT&T Account Executive or call 1 800 222-0400.



AT&T
The right choice.



LAN E-MAIL SYSTEMS

Talking LAN to LAN

For local-area network users, electronic mail is fast becoming just as essential an application as the spreadsheet and the word processor. E-mail is a natural application for the decentralized,

collaborative corporate environments that have emerged as a result of the proliferation of work group LANs.

The four major vendors in the E-mail market — 3Com Corp. with 19% of the market, Banyan

Systems, Inc. with 17%, Consumers Software, Inc. with 13% and cc:Mail, Inc. with 12% — have tripled their business in the last year, according to Gartner Group, Inc., a market research firm based in Stamford, Conn.

E-mail holds the potential to become a multimedia messaging application that handles text, images, voice, video and even animated digital graphics.

Developments that will help E-mail achieve this include the emergence of new technologies such as IBM's mixed-object Document Content Architecture, more powerful microprocessors that can handle both graphics- (continued on page 38)

Guengerich is director of publishing and editor-in-chief of technical journals, including the NetWare Advisor, at Houston-based Business Systems Group, Inc., a systems integration firm specializing in planning, implementing and managing networks and distributed applications. Menendez is a consultant and staff writer for special projects at Business Systems Group.

From simple message transfer to multimedia mailboxes, here's what's happening in LAN-based electronic mail.

CHART • GUIDE

A Network World Buyer's Guide chart comparing the features of a variety of local net E-mail products begins on page 36.

By STEVEN GUENGERICH and DAVID MENENDEZ

LAN E-mail products (continued on page 39)

| Vendor | Product | Compatible LAN OS | Graphics capabilities | Computer systems supported | Standards supported | Global directory | Send/receive faxes | Messages and files encrypted in transmission | Send/receive from other applications | Other E-mail supported | Notes | Base price/users supported |
|---|--|--|--|---|---|------------------|---|--|--------------------------------------|---|--|--|
| Action Technologies, Inc. Emeryville, Calif. (800) 624-2162 | The Coordinator, Version II | NetWare, IBM PC LAN | None | DISOSS, IBM PROFS, Digital Equipment Corp., Tandem Computers, Inc., Apple Computer, Inc. Macintosh (available separately) | MHS, gateways to others | Yes | Yes, with gateways | No | No | MHS | | \$1,800/10; \$3,000/30 |
| Alloy Computer Products, Inc. Marlborough, Mass. (508) 481-8500 | NXMAIL | Alloy NTNIX LAN Versions 1.6X, 2.X | None | Macintosh (with Alloy Mac Attach software) | None | No | No | No | No | None | | \$195/32 |
| Ashton-Tate Corp. Torrance, Calif. (213) 538-7895 | Framework III LAN, Version 1.0 | Starlan, NetWare, 3+Open/LAN Manager, VINES, IBM PC LAN | As attachments to messages | Various mainframes, minicomputers via terminal emulation | MHS, X.400 via third-party gateways | No | Send only, via third-party, MHS-compatible gateways | No | No | MHS-compatible systems via third-party gateways | Has ability to import fully formatted documents, spreadsheets and graphs within message (not as attachments) | \$995/5 |
| AT&T Computer Systems South Plainfield, N.J. (201) 898-6331 | AT&T Private Message Exchange (PMX)/StarMAIL | Unix, Starlan, StarGROUP, NetWare Version 2.0a, 3+, IBM PC LAN, 10NET Communications and other NETBIOS-compatible LANs | As attachments to messages | SNADS, PROFS, 3770/3780 via AT&T Mail Exchange; Unix-based minicomputers with AT&T 3B2 server | X.400 with PMX/X.400; X.500 with PMX/Distributed Directory System | Yes, via PMX/DDS | Yes, with AT&T Mail Service | No; software hooks available for user-written encryption | Yes | Unix systems, X.400-compliant systems via PMX/X.400; PROFS via Mail Exchange | Queries to the AT&T Corporate Mail Directory; price is dependent upon server | \$995 to \$1,900 per server/unlimited |
| Banyan Systems, Inc. Westborough, Mass. (508) 898-1000 | VINES Network Mail | VINES | As attachments to messages | Macintosh, via optional VINES MacMail gateway (with CE Software's Quickmail); IBM mainframes via optional 3270 gateways; minicomputer networks via third-party products | No | Yes | Send only, with third-party hardware/software | Yes | Yes | Quickmail (Macintosh), Computer Mail Systems' MHS Mail gateway between VINES and NetWare | | \$995 per server/unlimited |
| cc:Mail, Inc. Mountain View, Calif. (415) 961-8400 | cc:Mail LAN Package, Version 3.1 | Starlan, NetWare, 3Com, VINES, all DOS 3.1 record- and file-locking nets, all Apple Filing Protocol-compliant nets | Screen snapshots; built-in graphics editor and viewer; import graphics from scanners and other sources; compound document architecture; automatic translation among color graphics adapter, enhanced graphics adapter, video graphics adapter, Hercules and Macintosh graphics modes | Macintosh (via optional gateway); mainframe, PROFS and others via third-party gateways; minicomputers, DEC All-in-One, VMS, Unix and others via optional and third-party gateways | X.400, via third-party gateways | Yes | Yes, with third-party boards | Yes | Yes | Via optional cc:Mail gateway: GE Information Services, DEC All-In-One, Telemail, Easylink, MCI, VMS, Unix Mail, PROFS | Superior graphics and compound document capabilities | \$695/25 |
| CE Software Des Moines, Iowa (515) 224-1995 | QuickMail Version 2.2 | Appletalk | As attachments to messages | Unix/SMTP, VAX, via optional gateways | X.400, via third-party gateways | Yes | Yes, via third-party gateways | No | Yes | Gateways available for MHS, SMTP, VAX | Also makes Quickmail for PC | \$499.95/10 |
| Consumers Software, Inc. Vancouver (800) 663-8935 | The Network Courier Version 2.0, inter-network version | Starlan, NetWare, 3Com 3+Open, VINES, DCA 10NET Plus, IBM PC LAN, any MS-net compatible network system | As attachments to messages | Macintosh via third-party gateways; IBM PROFS via third-party gateway; VMS Mail via optional SMTP gateway; minicomputers via optional gateways to MVS (via X.400) and Unix (via SMTP) | X.400, via optional Network Courier 400 X.25 card and gateway | Yes | Send only | Yes | Yes | OfficeVision; X.400 systems, PROFS, Unix via optional gateways; exchange of API through optional File Format API | Excellent security, encryption scheme | \$995 for post office/150 with initial package |
| Cross Information Co. Boulder, Colo. (303) 444-7799 | Cross + Point | Starlan, NetWare, 3Com, VINES, LANtastic | None | Macintosh via optional Macnode gateway | None | Yes | Yes, but does not create cover sheet | Yes | Yes | None | | \$395 for file server/unlimited |
| D-Link Systems, Inc. Irvine, Calif. (714) 455-1608 | LANSmart Electronic Mail Program, 2.1 | NetWare with LANSsmart/NV, LANSmart | None | None | None | No | No | No | No | None | | \$95 per network/unlimited |
| Da Vinci Systems Corp. Raleigh, N.C. (919) 781-5924 | Da Vinci eMAIL for DOS, Windows or OS/2 Version 1.6 | Starlan, NetWare, 3Com, VINES; any network that recognizes a shared drive | As attachments to messages, including screen shots and scanned images | Macintosh, with Quickmail via third-party gateway; mainframes and minicomputers, any that support MHS, X.400 or Soft-Switch, Inc./Indsy gateways | X.400 via optional gateway | Yes | Yes, via gateways | | Yes | Any MHS-compatible product (or any accessible through an MHS gateway) | | \$995 for DOS server/unlimited |
| Daystrom Data Products, Inc. Fishkill, N.Y. (914) 896-7378 | Gallery MHS 1.1 | NetWare, other MHS-compatible systems | None | All, via third-party gateways | X.400 via third-party gateways | Yes | Yes | Yes | No | All MHS-based packages | | \$695 for server/unlimited |
| Enable Software Alameda, Calif. (415) 865-9805 | Higgins 2.3 LAN Server | Starlan, NetWare, 3Com, VINES | None | Mainframe via optional gateways to PROFS, MHS, 3Com 3+Mail; Soft-Switch SNADS gateway | Via third-party gateways | Yes | Send only, via Intel Corp.'s Connection coprocessor | Yes | No | Any MHS-based package via optional gateways | | \$695/8; expansions for 4, 12 or 20 users |

API = Application program interface

MHS = Message Handling System

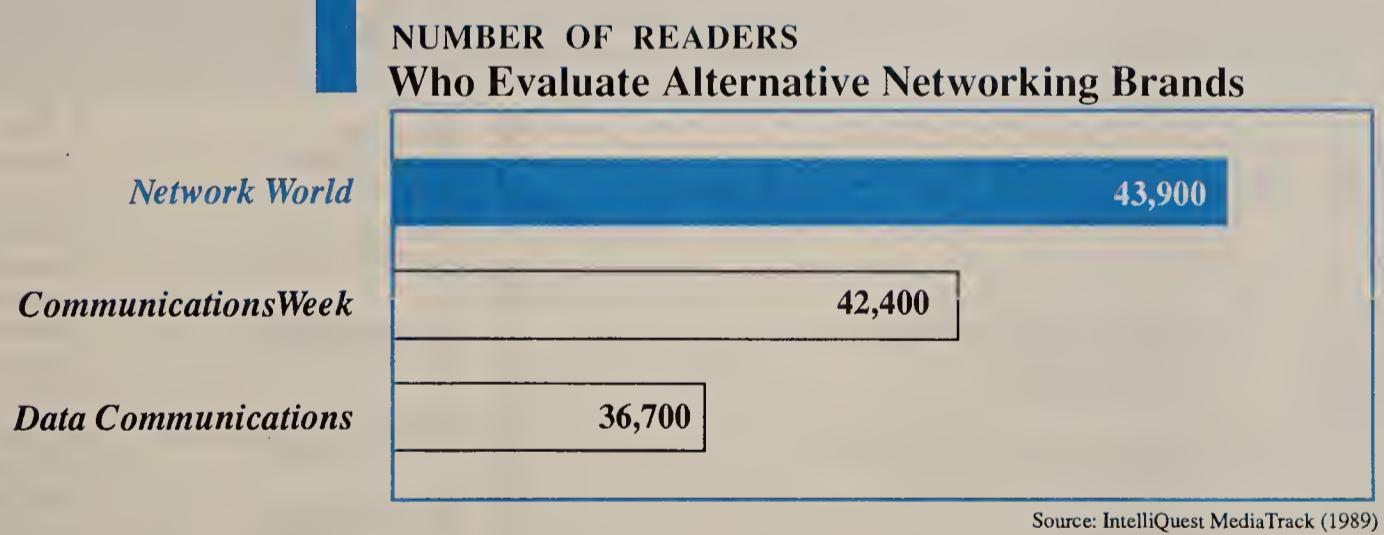
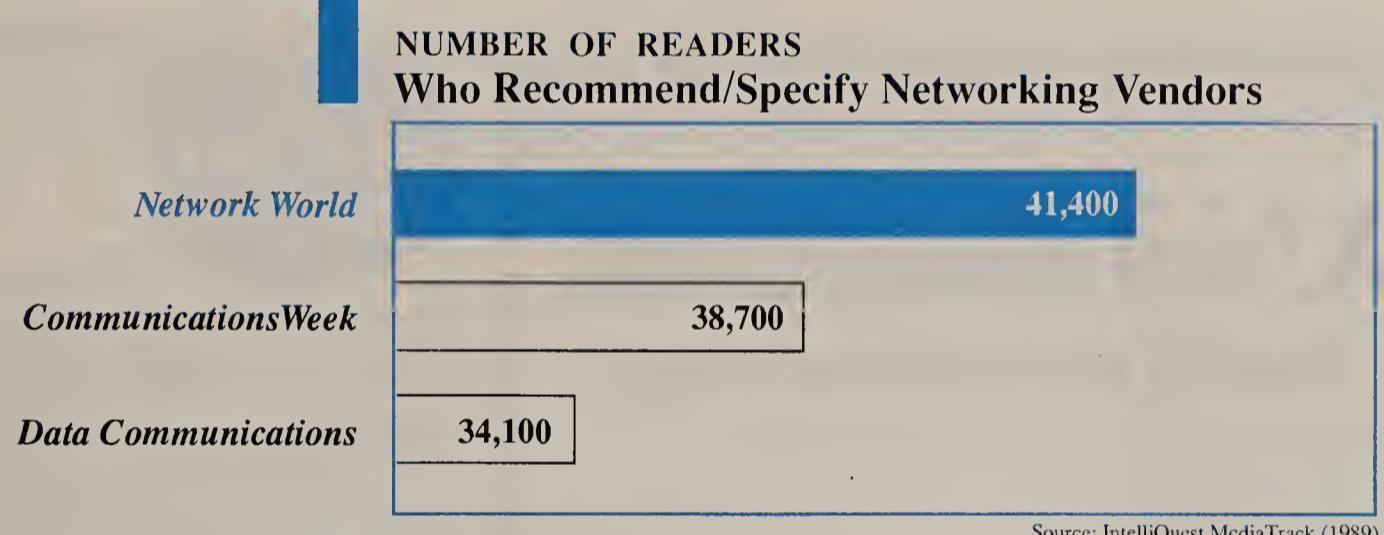
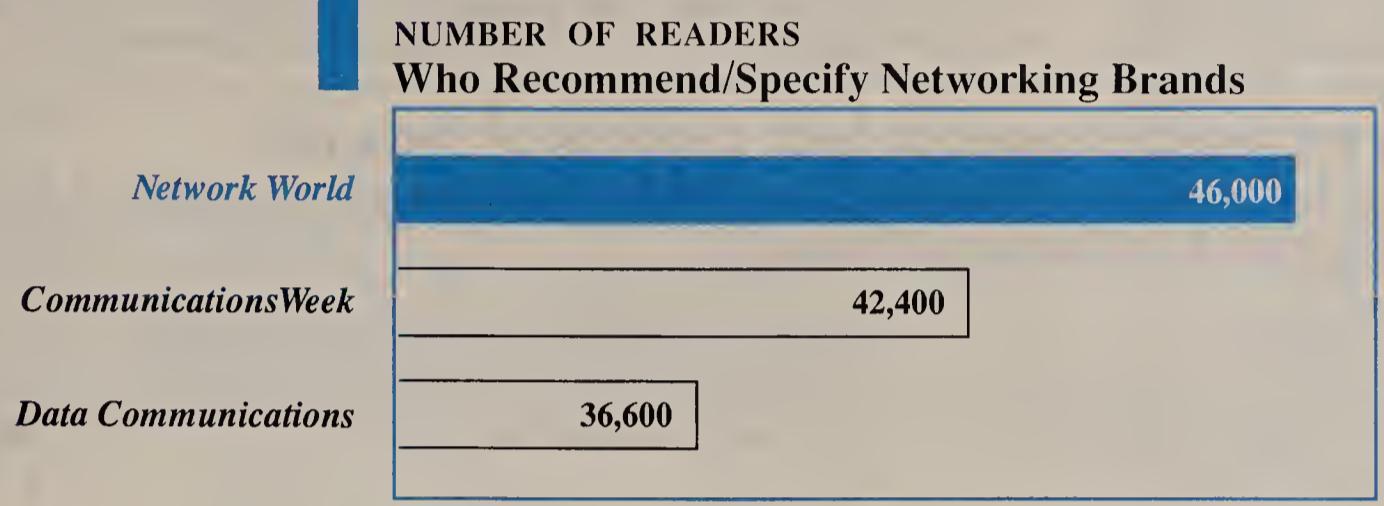
SMTP = Simple Mail Transfer Protocol

SNADS = Systems Network Architecture Distribution Services

This chart is based upon information provided by the vendors listed. These companies may offer other products, and others not listed may offer a full range of competitive products. Questions about chart listings should be directed to the individual vendors.

SOURCE: BUSINESS SYSTEMS GROUP, HOUSTON

Network World reaches MORE network decision makers THAN *CommunicationsWeek* AND *Data Communications*



For a copy of *Network World's* IntelliQuest Summary call
Evilee Lasker, Marketing Manager at 1-800-622-1108 today!

NETWORK WORLD

(continued from page 35)

math-intensive functions, and faster networks based on Fiber Distributed Data Interface and other emerging high-bandwidth standards.

Some products available today already have some degree of multimedia capability. For example, cc:Mail's cc:Mail LAN Package Version 3.1 allows users to send documents that combine scanned images and screen snapshots with text. E-mail package enhancement products that allow users to send and receive facsimile documents from desktop personal computers, rather than having to walk over to the fax machine, are also available.

Some companies, such as Alcom, Inc., offer enhancements such as fax gateways for other vendors' E-mail packages, rather

than offering E-mail packages themselves.

Still, for all its potential, E-mail hasn't matured yet. "If you picture E-mail as a person, it's an adolescent," says Joanne Witt, a senior systems analyst for Siemens Medical Systems, Inc. Indeed, as it develops, E-mail is experiencing growing pains, not the least of which are insufficient security and some reluctance among vendors to conform to standards. Users must be careful when choosing a package — what you expect may not be what you get.

What you can expect from most E-mail systems is efficient communication. Anyone who has played telephone tag or fought with a fax machine can appreciate E-mail's worth. It not only enhances the way we work, but when it is used in conjunction with groupware products, such as

IBM's OfficeVision, Lotus Development Corp.'s Notes and Mustang Software, Inc.'s Brainstorm, it's changing the way we work.

As Michael D'Amico, president of Daystrom Data Products, Inc. puts it, "E-mail is helping decentralize businesses and encourage peer-to-peer communication. That enhances productivity at all levels."

Just as users can reach anyone in the world on the telephone, eventually they should be able to contact anyone that works on a computer via E-mail.

In addition, says Bob Kavner, group executive responsible for managing the Data Systems and Federal Systems Groups at AT&T, "E-mail has democratized computing. It has broken down a lot of hierarchy. It's not surprising for me to receive mes-

sages from AT&T personnel at all levels within the organization."

Richard Edwards, a partner with the investment banking firm of Robertson, Stephenson & Co., says, "While E-mail alone is not justification for a LAN — not yet — it is quite visible as a benefit of having a LAN and is probably more of a benefit than application sharing."

E-mail products vary widely in terms of features and prices. The key, as with all technology purchases, is to first evaluate your needs and then seek the product that best fulfills the requirements. Not every firm needs Adobe Systems, Inc.'s Postscript fax capabilities with their E-mail, while others may not even need graphics capabilities. Insurance underwriters, who often need to keep exact replicas of forms on file, would benefit from having such graphics capabilities.

One of the most important features to look for in an E-mail package is ease of use. If E-mail is to become the telephone of the '90s, people will expect it to be as easy to use as a telephone. Selecting an E-mail

FAXNet is a service designed to help readers of Network World gather important information via FAX on products and services advertised in Network World.

How to Use FAXNet

Listed below in the FAXNet Directory are the FAX numbers of participating advertisers in this week's issue of *Network World* and the page number where the ad appears. To use FAXNet cut out the FAXNet form and make a copy of the form for each inquiry you want to make. Then just FAX it to the vendor's number listed in the FAXNet Directory.



FAXNet

Attention: Marketing Communications Manager

Subject: This inquiry was generated by a *Network World* reader who is responding via FAX to your advertisement in *Network World*.

Name _____ Title _____
 Company/Div _____
 Address _____
 City _____ State _____ Zip _____
 Phone _____ FAX _____

URGENT

Action Requested
 Request for Sales Call
 Request for Proposal
 Request for Information

Purchase Timeframe
 Within 60 Days
 Within Six Months
 Within One Year

Product
Advertised: _____

Scope of Purchase Responsibility
 Enterprise Wide
 Departmental

Purchase Influence/Number of Sites
 One Site
 2-9 Sites
 10-20 Sites
 21+ Sites

Intended
Application: _____

This week's FAXNet ADVERTISERS

| Company | Page |
|--|------|
| Andrew Corp. Fax: 708-349-5943 | 24 |
| Avatar Corp. Fax: 508-435-2470 | 4-5 |
| Micro Technology. Fax: 714-970-5413 | 56 |
| SynOptics Fax: 415-967-8710 | 20 |
| Teletutor Fax: 603-433-2260 | 47 |
| Warwick Data Syst. Fax: 201-586-3080 | 47 |
| Wellfleet Comm. Fax: 617-275-5001 | 16 |
| Western Digital Fax: 714-863-9326 | 10 |

package with an intuitive interface saves time and money in training and support. End users won't use an E-mail application if understanding how it works requires too much effort.

If multiple dissimilar networks are connected by E-mail, transparent addressing services and automatic global directory updating are desirable. These features allow mail to be addressed with less effort on the sender's part because the "post offices" communicate to let one another know where particular addresses reside.

E-mail should be quickly accessible. Hot keys or other shortcuts, such as mouse support or abbreviated addressing, encourage frequent use of E-mail, especially if E-mail messages can be sent while within other applications. An E-mail product that can act as a terminate-and-stay-resident (TSR) program on workstations, such as Para-Mail Version 2.15 from Paradox Development Corp., usually can accommodate this need. The TSR applications will also provide notification of new incoming messages. This feature is sometimes optional.

The memory required for an E-mail program varies from product to product. There's no hard and fast rule, but typical systems require 1M byte or less at the file server and virtually no memory at the workstation, even with TSR notification. On the other hand, some packages, such as The Network Courier Version 2.0 from Consumers Software, Inc., require no space on the file server but 192K bytes at each workstation.

Besides the simple ability to send and receive messages for users on the same network, the additional ability to send files, either as attachments or by import-

Still, for all its potential, E-mail hasn't matured yet. "If you picture E-mail as a person, it's an adolescent," Witt says.

▲▲▲

LAN E-mail products (continued from page 36)

| Vendor | Product | Compatible LAN OS | Graphics capabilities | Computer systems supported | Standards supported | Global directory | Send/receive faxes | Messages and files encrypted in transmission | Send/receive from other applications | Other E-mail supported | Notes | Base price/users supported |
|--|--|--|--|--|---|--|--------------------------------------|--|--------------------------------------|--|---|--|
| Indsy Software, Inc. Los Angeles (213) 933-8393 | Indsy/PC, Version 4.0 | NetWare Version 2.1 or later, IBM PC LAN Version 1.1 or later, other NETBIOS-compatible LANs | As attachments to messages | Macintosh, via optional MHS gateway; mainframes and minicomputers via optional MVS gateways | X.400 via optional gateway and integrated version of Retic OpenServer | Yes | Via optional gateway | Yes | Yes | Integrated with Indsy for IBM MVS, providing mail and related services to 327X users of CICS or TSO | | \$187,000/2,000 LAN users, 200 dial-in PC users and unlimited 327X terminal users |
| Microsoft Corp. Redmond, Wash. (206) 882-8080 | Microsoft Mail 2.0 | Appletalk, EtherTalk and compatibles | Supports PICT images and custom forms | Macintosh and DOS machines with Appletalk-compatible cards; VAX server | X.400, via third-party gateway | Yes | Yes, via third-party gateway | No | Yes | Unix/SMP, IBM PROFS/SNADS, DEC VMS/All-in-1, MHS-based systems, AppleTalk, MCI Mail (all via third-party gateways) | | \$395 for server, \$1,495 for 20-workstation package, \$125 per user for Macintosh/PC workstation |
| Paradox Development Corp. San Diego (619) 586-0878 | Para-Mail, Version 2.15 | NetWare | Scanned images, tag image file formatted files | Mainframes and minicomputers via third-party gateways | X.400 via gateway | Yes | Yes | Optional (customer-designed) | Yes | 3+Mail, Higgins, PROFS, SNADS, DISOSS, All-in-1, Hewlett-Packard Co.'s HP Desk, Wang Laboratories, Inc., VINES mail, MHS-based systems | Quickly installed, uses less than 15K bytes as a terminate-and-stay resident program | \$439.95/10; \$789.95/100 |
| Simpact Associates, Inc. San Diego (619) 565-1865 | Secunt-E-Mail | NetWare and any other MHS compatibles | None | Optional and third-party gateways available to VMS and SMTP | MHS; X.400 via third-party gateway | Distributed user data base and off-net addressing capabilities | With third-party gateways | Yes | No | All MHS systems | Allows recipient to see if message has been altered during transmission; originator can determine read-only privileges for recipient, status of sent messages (received and read) | \$1,195/10 \$1,995/unlimited |
| 3Com Corp. Santa Clara, Calif. (408) 562-6400 | 3+open Mail, Version 1.1 | 3Com's 3+Open | None | Macintosh, via 3+ Mail for Macintosh; Mainframes and minicomputers via 3Com and third-party gateways | X.400 via 3Com and third-party via gateways | Yes | Send only, with third-party gateways | Messages can be encrypted, but not attachments | No | Yes, via 3Com and third-party gateways | | \$1,190 per server |
| The TOPS Division of Sun Microsystems, Inc. Alameda, Calif. (415) 769-2496 | InBox, InBox Plus | Any LAN | Yes | Macintosh, IBM DOS and compatibles | Gateways under development | Yes | No | No | Yes | Optional gateways under development | | InBox, \$329/20; InBox Plus, \$995/100 |
| Transend Corp. Portola Valley, Calif. (415) 851-3402 | CompleatE-MAIL/MHS | NetWare, 3Com, IBM PC LAN, VINES | As attachments to messages | Macintosh, mainframe and minicomputer via third-party gateways | MHS | Yes | Via third-party gateways | Yes | Yes | All MHS-compatible systems | | \$295/5 |
| Waterloo Microsystems Waterloo, Ontario (519) 884-3141 | Bundled Waterloo PORT and PORT Lite LANs | PORT, PORT Lite | None | None | None | Yes | No | Yes | No | None | | \$2,495/255 stations; PORT Lite, \$695/5 stations, price includes bundled LAN and E-Mail system PORT |

API = Application program interface

MHS = Message Handling System

SMTP = Simple Mail Transfer Protocol

SNADS = Systems Network Architecture Distribution Services

This chart is based upon information provided by the vendors listed. These companies may offer other products, and others not listed may offer a full range of competitive products. Questions about chart listings should be directed to the individual vendors.

SOURCE: BUSINESS SYSTEMS GROUP, HOUSTON

ing them into a message, is also useful. Compare the cost per node. Some E-mail packages are licensed by server, others by number of users. Looking at the cost per node gives the buyer a better idea of what an E-mail package costs per user, making it easier to estimate cost savings per user.

Fax senders often request that the receiver confirm that the fax arrived in legible condition. Most E-mail packages automatically notify the sender when a transmission failure occurs, eliminating guesswork. Some packages, such as 3Com's 3+Open Mail Version 1.1 and Waterloo Microsystems' PORT mail system, take this feature a step further and indicate to users when the messages they have sent have been opened by the recipients.

The extent to which built-in word processors and graphics programs are necessary depends on the user's particular situation and preferences. Some E-mail products, instead of using a built-

in word processor, allow files of major word processing applications to be sent via E-mail. This does take extra effort on the part of the user, however.

While some users see E-mail as a casual means of communication, free from the strict format of many office memos, others are more concerned with message quality. "Like any other correspondence, E-mail is a reflection of yourself. It needs to be presented in a nice way, with words spelled correctly and a good format," Witt said.

Graphics needs depend on the user's line of business. Among the graphics features available are the abilities to combine text and graphics, send screen snapshots and modify received graphics. CC:Mail has powerful graphics capabilities, including the abilities to send and modify direct screen snapshots, and to combine text, graphics (either created in CC:Mail or imported from other sources), files and fax components in a single message.

Fax transmission and reception is important for E-mail users who send many faxes or for organizations that have only one fax machine for many users.

Using an E-mail system with fax capabilities transforms the fax machine from a simple office machine, such as a copier, to a shared network device, such as a printer. Ask users which takes less time to use. The common need for retransmission of faxes makes this feature even more attractive. "Faxing from the desktop in the background is a real time-saver," says Dean Crutchfield, MIS manager at Welchem, Inc.

Voice transmission of E-mail over phone lines is a feature being made possible by products such as VoxMail from VoxLink Corp. in Nashville. VoxMail allows users who are out of the office to use a phone to have their E-mail messages read to them by a synthesized voice.

VoxMail uses voice-into-text technology to give users voice ac-

cess to E-mail. It also allows users with push-button phones to reply to their E-mail messages and generate new ones by choosing from a list that includes simple messages, such as "Call me at [this number] as soon as you get in." Or users can attach footnotes to E-mail messages that say essentially "Check your voice mail for more information."

Perhaps the biggest source of controversy over E-mail features involves security. Most E-mail packages are simply not that secure.

Ed Curry, president of Lone Star Evaluation Laboratories, Inc., an independent LAN testing firm, agrees. "The E-mail systems I've used are not something you regularly trust with highly confidential material," he says.

Some E-mail packages, such as Action Technologies, Inc.'s The Coordinator, Version II and D-Link Systems, Inc.'s LANSmart Electronic Mail Program, 2.1, offer little in the way of security beyond requiring a password for ac-

cess. A step above this is message scrambling, in which the letters in a message are rearranged. However, there is a consistent, simple pattern to these scrambling schemes, and they are easy to decode. Almost all Message Handling System (MHS)-based systems use this scheme.

However, Consumers Software's Network Courier incorporates more security than most E-mail products by using a binary encryption code that codes the same letter differently within a message and also varies the pattern of encryption by user-unique keys. That is, each user's encryption pattern is different, and each pattern dictates how a letter's binary representation varies within a message. Securit-E-mail from Simpact Associates, Inc. also incorporates a key encryption scheme and allows senders to determine recipients' level of access to a message — for example, read-only access.

Many would argue that users (continued on page 48)

If This Is Your Phone System's M Maybe You Should Start C

With most phone systems, when you want a little extra security you get a row of batteries.

A lot like the one in your family car.

Their purpose?

To supply about 4 hours of reserve power. In case of disaster.

But floods, fires and power outages don't always come in the

small, convenient 4-hour size.

So what can you do?

Get a Pacific Bell Centrex system.

Unlike ordinary systems, Centrex operates on its own power supply. So even if a broken water main or a blown transformer knocks out your building's power source, it won't knock out your phone system.

You can still call out for help. Clients can still call in. You can still be in business.

In fact, you can still be in business even if smoke and fire drive you from your offices completely. Because we can reroute all your phone calls to any predetermined temporary space. No matter where it is.

What's more, all Centrex



ain Defense In Case Of Disaster, alling For Help Right Now.

switching equipment is kept at our place, instead of yours. So keeping it running, even through a long disaster, is our problem, not yours.

But it's not just disaster-ready equipment that makes Centrex the most reliable phone system ever made.

It's also our disaster-ready people. Centrex experts actually

help our clients plan ahead to weather almost any kind of calamity. While keeping the risk of big losses to a minimum.

And we'd like to help you develop your own disaster recovery plan, even if you aren't a current Centrex customer.

Just call your Pacific Bell Account Team or an Authorized

Sales Representative.

But do it soon.

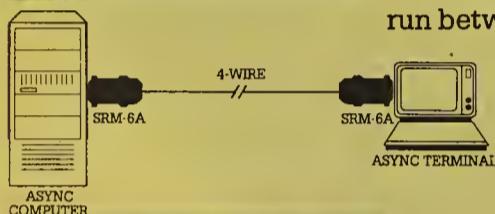
After all, do you really feel secure with a phone system that comes with batteries included?

We're making
things easier. SM

PACIFIC  BELL

DATA COMMUNICATIONS

RAD TO THE RESCUE.

**THE PROBLEM:**

Your data communications wires run between buildings. During a thunder storm, the equipment fails.

THE SOLUTION:

RAD's family of miniature short range modems, SRM-6, are transformer-isolated to protect your equipment from power surges and lightning.

The SRM-6 family has sync and async modems for 4-wire or 2-wire full duplex, operating at data rates up to 19.2 kbps in point-to-point or multipoint environments. They are easy to install, and operate without AC power.



RAD
data communications ltd.

U.S. Headquarters

151 West Passaic St., Rochelle Park, NJ 07662, Tel: (201) 587-8822, Telex: 6502403647 MCI, Fax: (201) 587-8847

Circle Reader Service No. 19

APPLICATIONS: ISDN

ISDN = I SEND DATA NOW!**With ManyLink for ISDN**

Share Printers. Put your printers where the users are with no added hardware or complications.

Quickly Send Messages. Its simpler than PROFS or All-In-One.

Convenient File Transfer. Point and shoot menus and background transfers increase productivity and eliminate sneaker net.

Easy to Use. ManyLink requires no time consuming or costly end user training.

ManyLink for ISDN is a great way to get your users connected to each other. With no effort they can share files and printers and quickly send messages. Why let your data lines sit idle when the ultimate PC/ISDN communication application is available now?

Call ManyLink Corporation today to evaluate ManyLink for ISDN or for free information on peer to peer ISDN communications.

ManyLink Corporation
P.O. Box 350
Redmond, WA 98073
(206) 881-5060

ManyLink
CORPORATION

All-In-One is a registered trademark of Digital Equipment Corp.
PROFS is a registered trademark of IBM Corp.
ManyLink and ManyLink for ISDN are registered trademarks of ManyLink Corp.
©1990, ManyLink Corp.

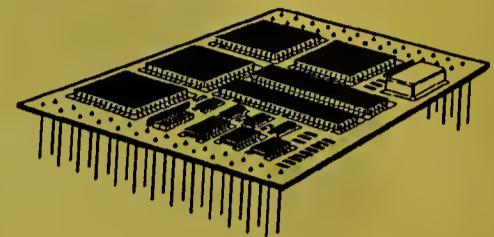
Circle Reader Service No. 18

NETVIEW-NET/MASTER NETWORK MANAGEMENT

We've Got the Guts You Get the GLORY!

NETVIEW LPDA CHIP SET ...

NetView device-level management is now available in a revolutionary new single chip set. The power of advanced LPDA modem or DSU/CSU diagnostic control functions is provided in one OEM module. NetQuest's C-100 VLSI chip set offers easy integration into any transmission device. It is compact (4" x 2.75") and low in cost, yet high in reliability and performance.

**... MAKES MODEMS NETVIEW COMPATIBLE**

- NetView (Net/Master) management functions for analog or digital, leased or dial-up transmission products.
- Line speeds from 50 bps to 72 Kbps. Requires only 5V DC.
- Easily added to diagnostic or non-diagnostic modems and DSU's, Hayes AT (V.25 bis) compatible modems, switched DSU's and similar products.
- No software and minimal hardware engineering effort required for target modem. May be customized to fit specific space requirements.
- Connectivity to the target modem via two TTL serial ports, allowing module to be installed in-line with the modem's serial TTL data interface.
- May be controlled over a standard microprocessor bus as an intelligent communication peripheral.

NetQuest's C-100 is all that you need to compete in the NetView modem arena, and become compatible with the industry's most popular network management system. Act now ... competitive modems require competitive network management.

ASK ABOUT OUR OTHER LPDA PRODUCTS:

V.32 MODEMS . CONTROLLERS . DSU/CSU's . LDM's



NetQuest Corporation

129H Gaither Drive, Mt. Laurel, NJ 08054
(609)866-0505 . FAX (609)866-2852

Registered Trademarks: NetView® IBM Corporation, Net/Master® CINCOM Systems, Inc.

Circle Reader Service No. 16

AUTOMATIC T1 PROTECTION

playing RUSSIAN ROULETTE with your T1 LINES?

Unprotected T1 lines are dangerous. They put your critical data at risk.

Larus Automatic Protection Switch Systems safeguard T1 lines.

Choose from a broad line of Larus automatic protection switch equipment.



Larus Corporation

848-3 East Gish Road

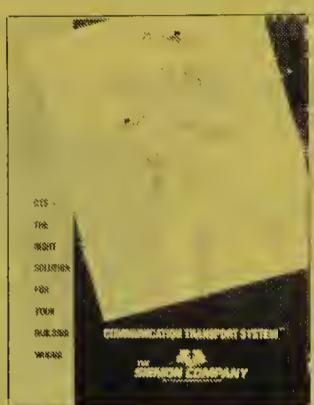
San Jose, CA 95112

Circle Reader Service No. 17

408/275-9505

COMMUNICATIONS TRANSPORT SYSTEM

Free from the
Siemon Company
The CTS
Design Workbook



Plan your own Communications Transport System (CTS) using the Siemon Company's new CTS Design Workbook. The workbook covers everything from building entrance to workstation to show you how you can wire new buildings easily and economically using unshielded twisted-pair technology.

This flexible, high quality system is backed by Siemon's quality products and technical support staff.

For clear, uninterrupted signals and adaptability for changing needs -- wire right with the Siemon Company. Send this card in for a free CTS Design Workbook today.



Circle Reader Service No. 1

76 Westbury Park Rd.
Watertown, CT 06795
Phone: (203) 274-2523
FAX (203) 274-0940

DATACOMM MATRIX SWITCH

NEW DIMENSIONS
Distributed Tandem Matrix Switch

LARGEST CAPACITY Smallest Size lowest cost

| | | |
|-----------|--------------------------|-----|
| MTRX-500 | 512 Ports up to 64 Kbps | 7½" |
| MTRX-4000 | 4096 Ports up to 64 Kbps | 15" |
| MTRX-8000 | 8192 Ports up to 64 Kbps | 28" |

Salient Benefits:

- Fractional T-1, from 64 Kbps to 2.048 Mbps
- 98% Cable Reduction, Twisted Pair 4000 ft DTE to DCE
- LAN-based PC Control - Ethernet or Token Ring
- NetView PC or Cincom NetMaster Universal Workstations
- User-Controlled Database - dBase III PLUS or dBase IV
- Integral BERG/BERT and S.A.M. Test Functions
- 30,000 ports installed at RBOCs and Fortune 1000 Companies

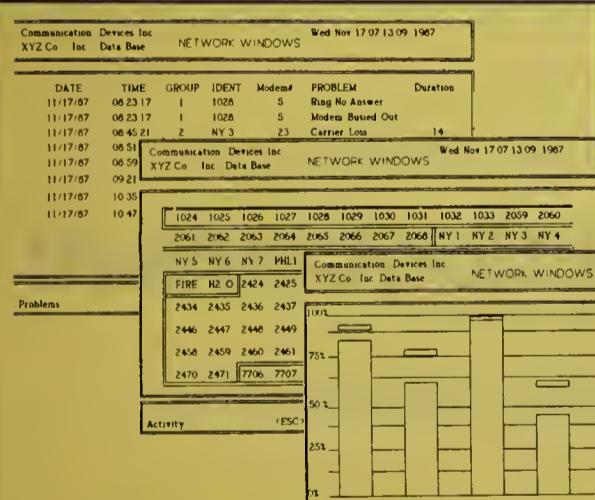


Datacomm
Management
Sciences Inc.

Circle Reader Service No. 5

"The Responsive Ones"
Norwalk, CT 203-838-7183
FAX: 203-838-1751

DIAL-UP MANAGEMENT



DAILY USAGE & ERROR REPORTS
AUTOMATIC BUSY OFF "RING NO ANSWERS"
MODEM VENDOR INDEPENDENT

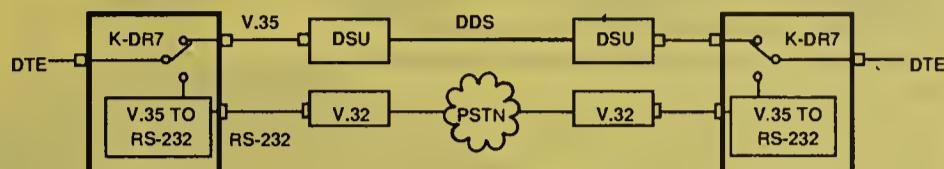
Call or write for information & DEMO Disk
Communication Devices Inc.
1 Forstmann Ct.
Clifton, NJ 07011
Phone 1-800-359-8561 FAX (201) 772 0747

Circle Reader Service No. 6

DISASTER RECOVERY

AUTOMATIC BACK-UP OF DIGITAL CIRCUITS

Dataprobe's Automatic A/B Switches allow digital circuits to be backed up by switched analog or digital services.



56 Kbps CIRCUIT WITH V.32 MODEM BACK-UP

K-AB-232 Industry's Most Versatile Automatic RS-232 A/B Switch.
K-AB-V35 V.35 Version for High Speed Circuits.
K-DR7 Back-up 56KBS DDS with V.32 Modems.
K-56 Security Back-up with Switched 56 Services.
SMART-LINE Dial-In Remote Control for any A/B Switch.



170 COOLIDGE AVENUE
ENGLEWOOD, NEW JERSEY 07631
(201) 569-6464 FAX (201) 894-0939

Circle Reader Service No. 7

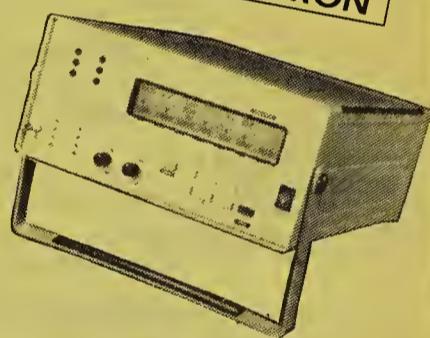
DS/1 TESTING

Get Dual-Line T1/DS1 Monitoring and Signaling Analysis

The Model 5110

- Dual Line Performance Monitoring
- Signaling Bit and Traffic Displays
- Controlled Slip Estimation
- Channel Access Features
- Wink Measurement
- Dialed Digit Display

10 Lyberty Way
Westford, MA 01886
(508) 692-5100 • 1-800-828-8766
Fax (508) 692-1938 • Telex 750245



tau-tron The Quality Tester

Circle Reader Service No. 8

Send For Free Info

NW Apr 90

For more information on any of the products and services advertised in NetworkWorld's ActionCenter, circle the Reader Service Numbers on this coupon which correspond to the advertisement of interest to you.

Complete the coupon information and mail to:
NetworkWorld
P.O. Box 5090, Pittsfield, MA 01203

(Expires 7/31/90)

| | |
|-----------|-------------------------|
| Name | 1 2 3 4 5 6 7 8 9 |
| Title | 10 11 12 13 14 15 16 17 |
| Company | 18 19 20 21 22 23 24 25 |
| Phone () | 26 27 28 29 30 31 32 33 |
| Street | 34 35 36 37 38 39 40 41 |
| City | 42 43 44 45 46 47 48 49 |
| State | 50 51 52 53 54 55 56 57 |
| Zip | |

NW Apr 90

ETHERNET LINE MONITOR

NetLight-1

ETHERNET™ / IEEE 802.3
Attachment Unit Interface Line Monitor

- Provides On-Line Network Status Indication
- Provides Valuable Troubleshooting Information
- Easy to Install

NetLight-1 is a line monitor for the ETHERNET™ or IEEE802.3 Attachment Unit Interface. It is available in two versions.

Version A provides LED's that indicate when a station is transmitting, receiving, or experiencing a Signal Quality Error. Version B provides these same indicators and also provides connectors for attaching an oscilloscope to monitor the signal waveforms. This simple device is useful for both troubleshooting and for providing immediate feedback of network status to the station operator.

For Additional Information or to place your order for Netlight-1 please call 1-800-525-2141 or contact:

Knowledge Implementations, Inc.

32 Conklin Road, Warwick, New York, 10990 (914)986-3492 FAX (914)986-6441

Dealer and OEM Inquiries Welcome
Quantity Discounts Available
Visa and MasterCard Accepted
In Stock for Immediate Delivery

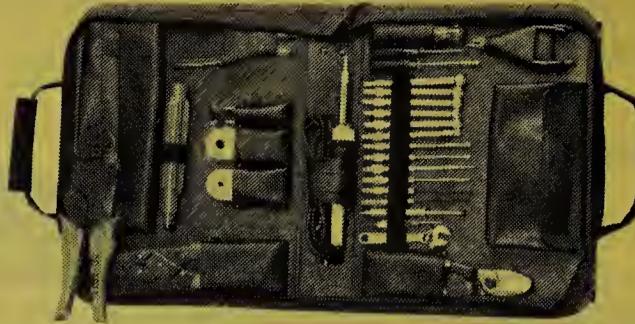
Circle Reader Service No. 9



LAN INSTALLATION AND SERVICE

TOOL KITS

NEW JENSEN JTK™-8 ETHERNET SERVICE KIT



Now in one compact kit, everything you need to install or maintain Ethernet, either thick or thin wire.

Special tool selection includes toggle style strippers to speed coaxial cable preparation. High leverage cable cutter easily cuts even plenum rated cables cleanly and efficiently. Full cycle ratcheting crimper with dies for N-Style and BNC connectors. Unique hand drill tool for installing non-intrusive transceiver taps. RS232 stripper and crimper for fabricating transceiver drop cables.

Along with these specialized tools there are nutdrivers, Torx drivers, Phillips and slotted screwdrivers, pliers, hex keys, soldering equipment and more.

The tools are contained in a 13-1/2 x 10 x 2-1/2" gray Cordura Plus zipper case with various size pouches and elastic straps to hold the tools securely. Charge Visa, Mastercard or American Express.

JTK-8 Tool Kit . . . \$349.00



JENSEN TOOLS INC.

Dept. 599 7815 South 46th St., Phoenix, AZ 85044
Phone: 602-968-6231 TWX: 910-9950-0115

FREE CATALOG

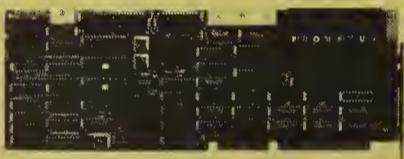
Hard-to-find precision tools, test equipment, and tool kits. Send for your free copy today!



Circle Reader Service No. 15

LAN AND WAN CONNECTIVITY

PLUG YOUR PC/AT DIRECTLY INTO HIGH-SPEED DIGITAL SERVICES.



PROMPTUS T-1 ACCESS MODULE

AT Bus-compatible WAN Adapter

On Board T1 CSU/DSU

- Provides fully integrated access to
 - T1: 1.544 Mbit/s
 - FT1: 56 to 1536 Kbit/s
 - CEPT: 2.048 Mbit/s
 - Primary Rate ISDN
 - Switched 56 with T1 Access
- Greatly reduces network file transfer time.
- Includes X.25 file transfer software.
- Plugs into single 16-bit PC/AT slot.

P R O M P T U S

Circle Reader Service No. 10

Promptus Communications, Inc.
Portsmouth Business Park, Portsmouth, RI 02871
Tel: (401) 683-6100 FAX: (401) 683-6105

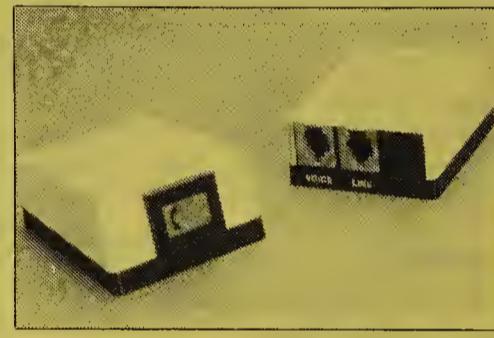
Call or write for complete information:

NEW PRODUCT



introduces....

THE LINE STATUS INDICATOR (Line Powered)



- * Know at a glance if line is busy
- * Know at a glance if your fax or modem is in use
- * Ideal for workstations or party line
- * Ready to use in minutes
- * Available in 2500 faceplate
- * Made in USA, lifetime guarantee

Call Today for More Information
800-452-7378
Crest Industries, Inc.
201 Frontage Rd. N. Suite B, Pacific, WA 98047
Circle Reader Service No. 4

**Profits come from sales...
Sales come from leads...
Leads come from an ad in ActionCenter!!**

Network World is the only publication that gives you weekly exposure for a month, directory-type pages, and bingo card response -- all for one cost-effective price!

Call today and generate leads and profits from your 300,000 impressions in *Network World's Action Center*.

Joan Bayon Pinsky

508-875-6400

Susan Egan (Pacific & Mountain Time)

714-250-3006

NETWORK CONNECTORS/CABLE



We Can Make Your Connections.

And do it fast! By getting Nevada Western voice and data products for moves and changes to you when they're needed.

Wise Components has the network interconnection devices for RS 232, coax, twinax, BNC/TNC (Wang) and IBM-type cabling. Including patch panels and all kinds of baluns.

And because we can provide you with Nevada Western's Wire Management System, confusion is eliminated, installation simplified. Which means you'll profit from lower installed costs.

Now you can provide superior connections. But best of all, you'll connect with Wise's superior service.



28 Henry Street
Greenwich, Conn. 06830
800 543 4333

NEVADA WESTERN
Voice And Data
Communication Systems

In Conn. 800 852 8557 • Fax: 203 531 4859
Circle Reader Service No. 20

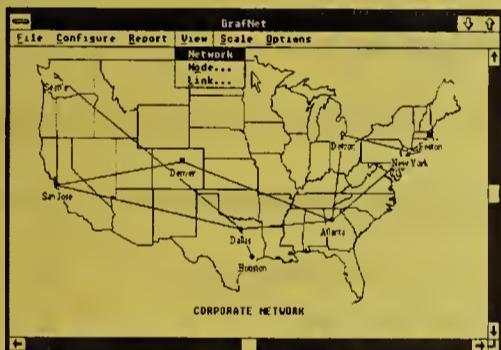
NETWORK PLANNING

GrafNet provides instant visual displays of network topologies...

PC Software allows easy viewing of network configurations.

FEATURES:

- * Built-in database automatically converts Area code/Prefix to an on screen geographical location.
- * Add and delete lines and nodes through our friendly Microsoft Windows interface.
- * View topology nation-wide or on a state by state basis.
- * Zoom in on a geographical area for closer viewing.
- * Print and plot to any device supported by Microsoft Windows.



\$450
FREE DEMO DISK

Call today for more information: (408) 446-9598

Network Dimensions, Inc. 5339 Prospect Road, Suite 122, San Jose, CA 95129
Circle Reader Service No. 3

Advertise In ActionCenter

Ads run for entire month (4 or 5 issues)

4 sizes available:

2 5/16" x 4" - \$1550 per month

4 13/16" x 4" - \$1850 per month

4 13/16" x 8" - \$3700 per month

9 5/8" x 4" - \$3700 per month

Call for information:

Joan Bayon Pinsky 800-622-1108 (In MA 508-875-6400)

Pacific & Mountain: Call Susan Egan 714-250-3006

NETWORK SCANNING AND MONITORING

Cable Scanner

Pinpoint Network Cable Faults Fast!

The Scanner is a monitor, fault finder, cable locator and much more. Helps you pinpoint the location of shorts, opens or breaks. Its 32 character display reports the fault in plain English "short at 306 ft". With an oscilloscope, Scanner's high speed, pulse generating circuitry gives a detailed view of the entire LAN including transceiver, terminator and multiple faults.



- * Cable length measurements
- * Locate breaks, shorts, opens, bad crimps, etc.
- * LAN activity monitoring
- * Find cables in ceilings, walls, floors
- * Cable TV troubleshooting
- * Generate as-built drawings and specifications
- * Isolate faulty network interface cards
- * Very simple to operate



M-Test Equipment
P.O. Box 460008
San Francisco, CA 94146-0008

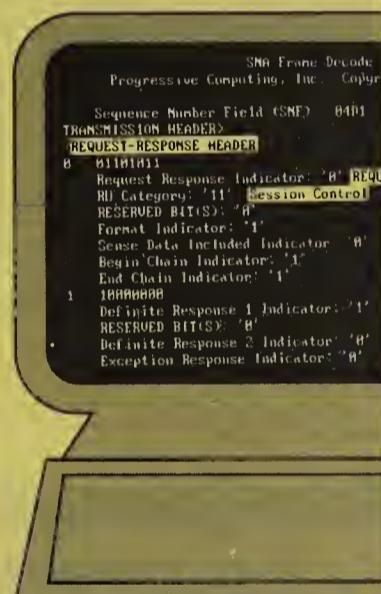
Call for Info

Outside CA: (800) 334-4293
Inside CA: (415) 861-2382
FAX: (415) 864-1076

Circle Reader Service No. 11

PC BASED PROTOCOL ANALYZER

A PC-based protocol analyzer that speaks your language. Plain English!



LM1 is a trademark of Progressive Computing, Inc.
Circle Reader Service No. 12

Now you can analyze data and zero in on errors more quickly. The LM1 Protocol Analyzer gives you easy-to-read decoded spelled out in plain English. It uses exact language from the standards for X.25, SNA, QLLC, and Q.931 protocols.

With the LM1, you don't miss a bit. It displays and explains every bit in a frame. It also highlights key details.

In-depth analysis in plain English. To see how the LM1 can expand your test equipment vocabulary, give us a call at (708) 574-3399.

Progressive Computing

Progressive Computing, Inc.
814 Commerce Drive, Suite 101
Oak Brook, IL 60521 USA
(708) 574-3399 FAX (708) 574-3703

PROTOCOL ANALYZER

Omni I/O™

PC Based Protocol Analyzer



\$495

Fast, friendly user interface.
Excellent data visibility.

- Integrated data capture, analysis, DOS file storage. Named configurations, formatted print.
- Async, Sync, BOP's (SDLC, X.25, etc.), Transparent, ASCII, EBCDIC, IPARS, user defined.
- Fits PC, AT compatible, 386 and Laptop with standard bus and CGA, EGA or VGA.
- Programmable - API (\$695) for unprecedented power and flexibility.

COMPUTRONICS

Romney, WV 26757

P.O. Box 2040, 151-C Jersey Mt. Road, Romney, WV 26757 • 304-822-3086

PROTOCOL ANALYZER

MONITOR 4 LINES
FOR THE PRICE OF 1!

with

M-SCOPE

DATA LINE MONITOR

EXPANDABLE
EASY TO USE
AFFORDABLE

- Multi-Line Data Line Monitor
- **ALL** Transaction Exceptions Records Logged to Disk
- Response Time Analysis
- Easily Expandable to 16-Lines

- Management Reports
- Line Utilization & Error/Status Records Logged to Disk
- Best Line Analysis Available
- Trouble Ticketing

Previously Available Only to the Largest SNA & PARS Networks.

Takes Performance Analysis One Step Further!

CODARAM

corporation

"The Data Communications Specialists"

We Make Data Communications

EASY

4040 Nine/McFarland Rd. #800 • Alpharetta, GA 30201
(404) 664-3510 • (404) 664-3610 FAX • (800) 726-0278

Distributors and Dealers inquire

Circle Reader Service No. 30

TEST EQUIPMENT

FULL RANGE ANALOG
TESTING—HAND-HELD
CONVENIENCE

- Level/Frequency
- Noise and noise with tone
- Signal-to-Noise (S/N) ratio
- Peak-to-Average Ratio (P/AR)
- Impulse noise
- DTMF/MF and pulse dialing
- IEEE/Bell and CCITT versions

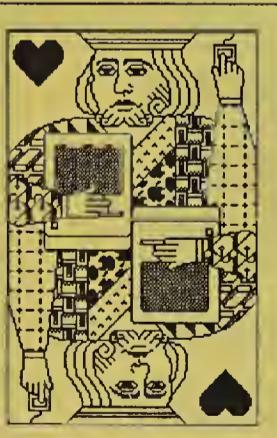
PRICE: \$1,995⁰⁰

Circle Reader Service No. 21



Electrodata, Inc.

23020 Miles Road
Bedford Heights, Ohio 44128-5400
Call Toll-Free 1-800-441-6336
(216) 663-3333 TWX: (810) 427-2280
FAX: (216) 663-0507



Network World's Direct Response Card

Decks can be your trump card for generating quality leads and boosting your sales. When you advertise in our decks, your message reaches audited buyers, for just pennies a contact. And with your advertising message on one side and your company name and address on the other, we make it easy for our readers - your customers - to respond to your message.

For information on issue dates, closings and rates, call:

Joan Bayon Pinsky
Sales Director/
Product Classified Advertising
1-800-622-1108
(or in MA 508-875-6400)

Your marketing success is in the cards—
Network World's Direct Response Cards.

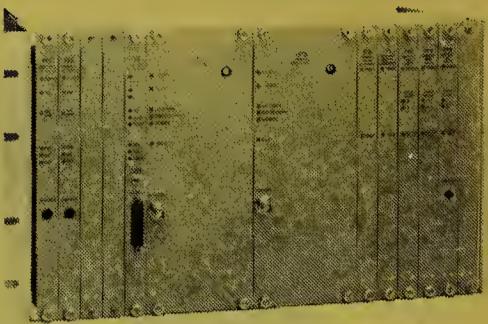
Circle Reader Service No. 32

Susan Egan
Account Executive
714-250-3006
(Mountain and Pacific
time zone advertisers)

TIMING SIGNAL GENERATOR

NETWORK
SYNCHRONIZATION
INTERFACE

- Isolates From Reference Faults
- Clean, Accurate Output
- Monitors Network Performance

ACCU-SYNC 3800
Timing Signal Generator

The ACCU-SYNC 3800 ideally meets synchronization requirements of private networks. Captures average frequency and isolates from interruptions, jitter and wander of DS1 or 56 kb/s reference. Gracefully accepts Cesium, Loran, GPS or WWVB as primary or secondary Stratum 1 source. **ACCU-SYNC 3800** — it's the answer.

For more information call :

FTS / **AUSTRON** INC
TELECOM PRODUCTS GROUP

AUSTRON, INC.
P.O. Box 14766
Austin, TX 78761-4766
(512) 251-2313
FAX (512) 251-9685

AUSTRON, INC.
1930 Isaac Newton Sq. Suite 111
Reston, VA 22090
(703) 471-7963
FAX (703) 689-4684

FTS, INC.
34 Tozer Road
Beverly, MA 01915-5510
Toll Free 1-800-544-0233
FAX (508) 927-4099

Circle Reader Service No. 14

X.25 NETWORK CONNECTIVITY

TIL Systems has added Emucom dial technology to its product line and now proudly offers a new dimension to its exciting array of X.25 solutions.

Whether your environment is standalone, LAN, Async, SNA, or BSC; over dialup or leased line,

We Have The X.25 Solution For You!

- * X.25/X.32 monopads and outdial products
- * 3270 SNA
- * 3270 DSP/DSI
- * 5250
- * 3780
- * LAN Gateway
- * APIs for DOS and UNIX
- * Multi-Session/Multi-Program

TIL offers a wide variety of hardware configurations ranging from PC half-cards to a 16 port multi-protocol unit.

All TIL products are CCITT compliant and are fully network manageable. Optional DES encryption is available as a security feature.

CALL TODAY FOR INFORMATION!

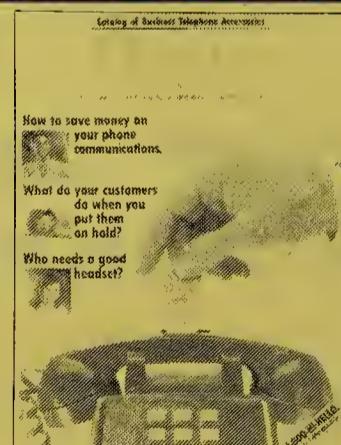
TIL SYSTEMS, INC.
225 Stedman Street, Bldg. 27
Lowell, MA 01851

(508) 970-1189

FAX (508) 970-1295

Circle Reader Service No. 31

PHONE ACCESSORIES



The Hello Direct Catalog has hundreds of ideas for improving the efficiency and convenience of using your business telephone. Inside this order-direct catalog, you'll find headsets, fax and cellular products, call amplifiers, cost control devices, modular cords and connectors, and much more. Plus you'll enjoy toll-free ordering, knowledgeable sales help, and a risk-free, no hassle guarantee.

To start your free subscription call:
HELLO Direct 800-HI-HELLO
That's 800-444-3556.

HELLO
Direct

Circle Reader Service No. 2

For Information
On Advertising
In ActionCenter

Call Or Write:

Joan Bayon Pinsky
at 1-800-622-1108

(or in MA 508-875-6400)

The Meadows,

161 Worcester Road, Box 9172,
Framingham, MA 01701-9172

Pacific & Mountain:

Susan Egan at 714-250-3006
18008 Sky Park Circle,
Suite 145, Irvine, CA 92714

NETWORKING MARKETPLACE

Network World Editorial Features

April 2

LAN Buyer's Guide: LAN E-mail Systems & E-mail Interconnection Products

April 9

Datacom Buyer's Guide: Network Element Management Systems
Bonus Distribution: Network Management Solutions

April 16

Telecom Services Buyer's Guide: Multilocation Pricing Plans/Buyer's Groups
Bonus Distribution: Supercomm '90

April 23

Network World/LanQuest LAN Test Series: Matching Network Adapters To Servers

April 30

Trends and Technologies Reshaping Networks: Globalization of Networks

May 7

Datacom Buyer's Guide: Gateways, Routers & Bridges

May 14

Telecom Services Buyer's Guide: Interchange 800 & WATS Call Detail

May 21

Network World Survey: Critical Issues Facing Users *Bonus Distribution: ICA*

May 28

Network World/LanQuest LAN Test Series:
Use Of LAN Analyzers To Detect Interoperability Problems *Harvey Ad Study*

June 4

LAN Buyer's Guide: LAN DBMS Software *Bonus Distribution: Comdex Spring*

June 11

Datacom Services Buyer's Guide: Switched Data Services

June 18

Network World/LanQuest LAN Test Series: Bridging Ethernet & Token Ring Networks

June 25

Trends Reshaping Networks: Deregulation of Carriers

DATA COMM

SELL OR TRADE YOUR SURPLUS

modems, mux's, data pbx, etc.

REPAIRS • UPGRADES • INSTALLATION • CABLING

MICOM

codex

paradyne

AT&T

IBM

Racal-Milgo

ARK CASE

Datatel

UDS

Universal Data Systems

G

General DataComm

NEW AND USED EQUIPMENT BACKED BY WARRANTY

NATIONWIDE SERVICE, MAINTENANCE AND INSTALLATION

we need to buy

- TIMEPLEX MULTIPLEXORS
- UDS 208 AB MODEMS
- CODEX 208 AB MODEMS
- MICOM BOX 2 MUX'S
- GDC MEGA SWITCH

call us...

(201) 586-3070 FAX 586-3080

 **Warwick**
DATA SYSTEMS, INC.

66 FORD ROAD, DENVILLE, NEW JERSEY 07834

TRAINING

TELETUTOR

COMPUTER-BASED TRAINING

LOCAL AREA NETWORKING

X.25 IN MODERN DATA COMMUNICATIONS

T1 TRANSMISSION BASICS

Find out why thousands of companies use Teletutor to solve their data and telecommunication training needs.

Call for FREE catalog

1-800-542-2242

(603) 433-2242

The following advertisers appear on the FAXNeT form on page #38:

Teletutor

Warwick

Data Systems

(continued from page 39)

trust E-mail more than they do telephones, faxes or paper correspondence. This further emphasizes the need for better E-mail security. The peer-to-peer nature of E-mail and its capabilities for encouraging project collaborations can lead to situations in which confidential material is exchanged under less than secure conditions. Corporate policies with regard to what kinds of information can be trusted to E-mail also tend to be less defined than policies for other forms of communication.

Users are not only lax in deleting messages, but they often trade passwords to provide access to files that need to be shared or reveal their passwords to new or visiting users not yet set up on the network. For example, a significant amount of

evidence in the Iran-Contra Affair was obtained by retrieving electronic messages sent by the defendants to one another.

Another feature related to security is

curse. Many systems, such as Para-Mail, cc:Mail and Network Courier, have automatic message logging features, which can make a system administrator's job easier.

“Some of our developers loathe MHS, but we'll supply a gateway to it if that's what the customer wants.”



automatic message tracking. Tracking a message can be necessary to determine where and why transmission failure oc-

If E-mail is to truly revolutionize the way companies do business, however, the problem of security in the context of an

even larger issue — interconnectivity with other hardware and software platforms — must be addressed. E-mail demands access, and not just personal computer-to-personal computer or LAN-to-LAN access. There are users on mainframes, minicomputers and Macintosh nets, as well as isolated remote users, that want to interact via E-mail.

Although standards such as X.400 were developed before the E-mail explosion, there is still a gap between the theory of how interconnectivity should work and the practicality of how it is working in the real world. The result has been a proliferation of companies that manufacture gateways between heterogeneous E-mail platforms.

But some users and vendors think using proprietary gateways is only a patchwork solution, one that discourages cooperation and hampers progress toward the implementation of X.400 and X.500 standards. Some see salvation through standards. Both the Electronic Mail Association and the Application Program Interface Association support X.400, which is actually a set of eight recommendations from the Consultative Committee on International Telephony and Telegraphy that specify the guidelines for message exchange between different computers.

“X.400 is a standard that accommodates future needs, such as electronic data interchange, but also works today,” says John Barraclugh, a spokesman for Retix.

In early 1988, the CCITT and the International Standards Organization drafted the X.500 recommendation, intended as a globally distributed data base system that contains the E-mail addresses of all persons using any E-mail system. X.500 now receives little more than lip-service, but E-mail products that support it will become increasingly common by the mid-1990s.

Some E-mail vendors see MHS as an emerging standard. MHS was developed by Action Technologies as a store-and-forward engine for the company's office productivity package, The Coordinator, currently in Version II. Novell, Inc. entered an agreement with Action Technologies to include a version of MHS in NetWare, beginning with NetWare Version 2.11.

Even those who oppose MHS for its lack of security acknowledge its position in the marketplace. “Some of our developers loathe it, but we'll supply a gateway to it if that's what the customer wants,” says Jack Grushcow, president of Consumers Software.

Still others take a pragmatic approach. “We fully endorse X.400, but MHS has been a very useful and inexpensive solution that works today. It's a transitional step,” says Michael Long, a spokesman for Paradox.

One reason why MHS is so popular is that NetWare, which incorporates MHS, is a market leader in LAN installations. Most industry analysts agree that Novell has 60% or better of the LAN market. NetWare's built-in messaging system platform is designed to support E-mail applications, and developers have found it easy to create E-mail and groupware applications that exploit this platform.

What does E-mail's future hold? Users will see more compound document capabilities and more groupware products, which will continue to encourage a distributed work environment. For example, IBM's OfficeVision is built on design principles that make sending compound documents possible.

The choice between X.400 and MHS will (continued on page 50)

TEXPO® 90
TOUCH THE FUTURE OF TELECOMMUNICATIONS



Take a Look at the Future of Your Business. May 2nd, 3rd and 4th at the Anaheim Convention Center.

Talk, touch and listen to the new technology.

What new technologies will profoundly change the way you do business in the years to come? What telecommunications systems can you begin using right now to improve productivity and give you a competitive edge?

You'll find answers to these questions and more at TEXPO 90, the most unique and exciting telecommunications event of the year. Sponsored by Pacific Bell, TEXPO 90 features interactive exhibits from such companies as IBM, Apple, AT&T, Sony and Xerox. You'll be able to talk to, touch and listen to the new technology, including:

- **Virtual reality.** Take part in an astonishing demonstration of a computer-synthesized world.
- **High-definition television.** Learn about the technology behind the video monitors of the future.

- **Speech recognition.** Have your first real conversation with an intelligent computer. TEXPO 90 also offers you three days of informative seminars

and special events at no charge, plus keynote speeches by communications specialists Philip Quigley, Nicholas Negroponte and Edwin Newman.

Don't miss TEXPO 90. Preregister today.

TEXPO 90 promises to be the most exciting telecommunications event of the year.

And, if you preregister now, you can attend *free of charge* instead of paying \$20 at the door. Plus, you'll be able to sign up in advance for the seminars you want to attend.

To preregister, simply call (or fax to) the toll-free numbers listed at left.

Don't miss this opportunity to see the future of your business. Preregister for TEXPO 90 today.

We're making things easier.™

PACIFIC BELL®

A PACIFIC TELESIS COMPANY / / / / /
© 1990 Pacific Bell

(continued from page 33) token-ring number, and four bits specify the bridge number. All in all, three ring numbers and two bridge numbers are given. These specify the route from Station A on Segment 2 to Server B on Segment 4; the route is called a two-hop path because it traverses two bridges.

In general, the routing infor-

not contain any routing information and, therefore, should not be passed.

If the RII bit is set to one, then the bridge must examine the routing information field. If the bridge finds — grouped together and in correct order — the ring numbers for the two rings that it connects, along with its own bridge number, then the bridge

Since the main processor in a source routing bridge needs to deal only with frames that are going to be passed, the performance of a source routing bridge measured in passed frames per second is usually superior to a transparent spanning tree bridge. This feature of a source routing bridge can be especially important to any user upgrading from a 4M to a 16M bit/sec token-ring network.

Also, for a technical reason, such as the setting of the Address Recognized Indicator (ARI) and Frame Copied Indicator (FCI) bits, the recognition of frames to be passed must always be completed in real time on a token-ring LAN.

Transparent spanning tree bridges, which cannot properly set these bits, cannot be used if upper-level protocol software relies on the ARI and FCI bits. IBM software does make these bits available to software above the logical link control (LLC) level.

Route discovery

One of the more interesting aspects of source routing is the way in which the source station discovers the route to the intended destination. This method, which is dynamic and allows for the selection of an optimal route, depends on the transmission of a special type of frame, called a broadcast frame.

A broadcast frame will circulate on all token-ring segments in a LAN. Essentially, broadcast frames start out with information in the control bytes but with a blank routing information field.

Each time it passes a broadcast frame, the bridge fills in part of the routing information field with information regarding its two segment numbers and one bridge number. When the broadcast frame arrives at the destination specified in its six-byte destina-

tion address, information regarding the route it took to get there has been filled in by whatever bridges it has passed through.

The destination station then turns the frame around and returns it to the source station, which then also knows the route. Figure 2 on page 49 shows how bridges fill in the source routing information field.

Two types of broadcast frames, called single-route and all-routes broadcast frames, are intended to circulate on all the rings in a network, but the single-route type should circulate on each ring only once. This is accomplished by configuring only certain bridges in the network with the capability to pass single-route broadcast frames. These

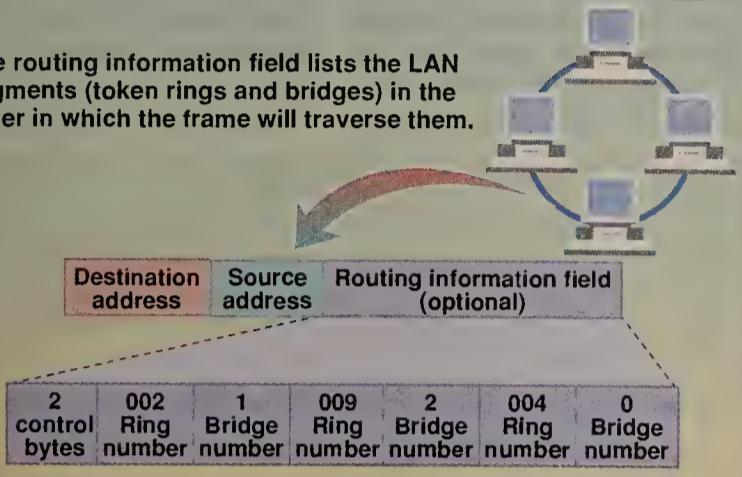
In the case of networks with multiple connections, more than one frame is received and the source can select the optimal route according to criteria such as the least number of hops. The source's capability to select an optimal route is a unique advantage of the source routing method.

Besides filling in ring numbers and bridge numbers in the routing information field of a broadcast frame, bridges also specify a maximum frame size that can be passed. This information is put into a four-bit field in the two control bytes that start the routing information field. The source station may use this information in selecting an optimal route.

Example of a routing information field

Figure 1

The routing information field lists the LAN segments (token rings and bridges) in the order in which the frame will traverse them.



GRAPHIC BY SUSAN SLATER

SOURCE: ANDREW CORP., TORRANCE, CALIF.

mation field can contain a maximum of 18 bytes, including the two control bytes. Twelve-bit ring numbers are always put together with a four-bit bridge number to form two bytes of information.

Therefore, a maximum-length routing information field can contain eight ring numbers. A frame that traverses eight rings must pass through seven bridges, producing a seven-hop limit, which can never be exceeded when using source routing.

It is now easy to see how a source routing bridge performs its basic function.

The bridge must examine every frame on each of the token-ring networks it connects. If the RII bit in the source address is set to zero, then the bridge knows immediately that the frame does

not pass that frame to the other ring. Otherwise, the frame is not passed.

Any frame that a bridge correctly decides not to pass is said to be filtered. Bridge vendors usually quote two performance figures for their products — the number of filtered frames per second and the number of passed frames per second.

One important advantage of source routing bridges over transparent bridges is the ability of the source routing bridge to quickly recognize frames that are to be passed. A properly designed source routing bridge should always be able to examine all frames on each token-ring and accept for passing only those frames that should be passed to the other ring.

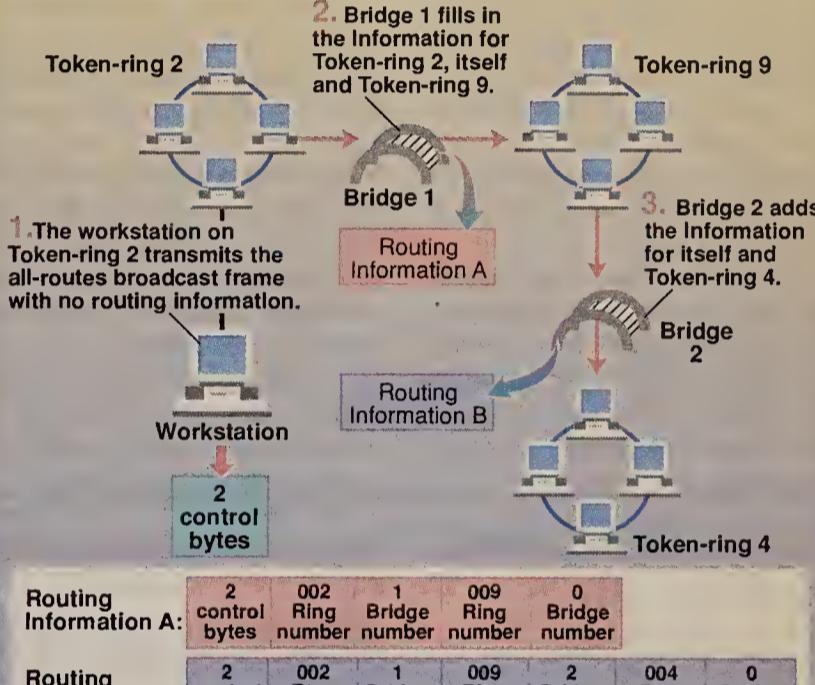
One of the more interesting aspects of source routing is the way in which the source station discovers the route to the intended destination. This method, which is dynamic and allows for the selection of an optimal route, depends on the transmission of a special type of frame, called a broadcast frame.

A broadcast frame will circulate on all token-ring segments in a LAN. Essentially, broadcast frames start out with information in the control bytes but with a blank routing information field.

Each time it passes a broadcast frame, the bridge fills in part of the routing information field with information regarding its two segment numbers and one bridge number. When the broadcast frame arrives at the destination specified in its six-byte destina-

Progress of an all-routes broadcast frame

Figure 2



GRAPHIC BY SUSAN SLATER

SOURCE: ANDREW CORP., TORRANCE, CALIF.

bridges are arranged to connect into a spanning tree topology.

With a spanning tree topology, there are no loops in the network; consequently, there is only one path between any pair of rings in the net.

Before passing either type of broadcast frame, bridges examine the partially filled-in routing information field and will not pass the frame onto a ring if it has already circulated on that ring. This, along with the seven-hop limit, constrains the number of copies of all-routes broadcast frames that circulate on a token-ring network.

By using both single-route and all-routes broadcast frames, a source station can discover the optimal route to the intended destination. In the method used most frequently, the source sends a single-route broadcast frame to the destination. The destination station receives one copy of this frame, then sends an all-routes broadcast frame back to the source station.

The original source station receives one or more copies of this all-routes broadcast frame. Each of these frames contains, in its routing information field, a complete route to the destination.

Because complete routing information is contained in the frame header, a source routing bridge can quickly decide which frames are to be passed.

As was mentioned earlier, this is important both for bridge performance and to meet the token-ring protocol requirements for proper setting of the ARI and FCI bits.

Token-ring adapter circuits built from Texas Instruments, Inc.'s TMS380 chip set use External Copy Hardware, a feature that contains the logic to examine a frame's routing information field and immediately decide whether or not to copy the frame to the adapter's memory.

The hooks to implement this External Copy Hardware feature are also available in Texas Instruments' new 16M bit/sec chip set.

Maximum bridge performance and IBM compatibility require that the External Copy Hardware examine the routing information field completely and copy into adapter memory only those frames to be passed by the bridge.

Because all frames that traverse the bridge must carry the routing information field in the

(continued on page 50)

Hot developments in source routing

Theoretically, you can use source routing on an Ethernet local-area network. However, transparent spanning tree bridges were developed for Ethernet LANs and seemed certain to remain the only bridging scheme to be used on Ethernet bridges. There just wasn't a commercial reason to encourage source routing on Ethernet.

However, at last month's plenary meeting of the IEEE 802 committee in Irvine, Calif., the boundary between transparent and source routing domains began to crumble. IBM proposed a new bridge standard, known as the source routing transparent (SRT) bridge, which merges the two bridge architectures of 802.1 transparent spanning tree bridges and 802.5 source routing bridges. "This new standard will solve interoperability prob-

lems that have plagued users for the last four years," says Kirk Preiss, a communications specialist at IBM and the rapporteur of the source routing addendum to the 802.5 standard.

According to Colin Mick, vice-president and general manager of San Jose, Calif.-based LanQuest Group Corp.'s LAN Testing and Services Division, the SRT bridge will ameliorate one problem users often face when bridging LANs.

If you connect two source routing bridges with a transparent bridge, you can't send data end to end because the transparent bridge in the middle will not forward the packets. The SRT bridge will solve this problem.

IBM said it hopes to have this new standard finalized in time for the next plenary meeting to be held in July in Denver so that

it will be ready for an International Standards Organization ballot later this summer. If IBM achieves this goal, it might well set a world record for speed in the standards process. "The 802.1 and 802.5 committees, which have had a well-established, but not always friendly, working relationship, are now moving rapidly toward resolving a problem that's been around for a long time," Mick says.

According to Preiss, the IEEE 802.5 token-ring subcommittee has abandoned previous plans to devise a standard for a source routing-to-transparent bridge interface, which would sit on the boundary between otherwise self-contained domains, in which one bridge type or the other is used uniformly.

— Everett Thiele
and Alison Coniffe

AT&T targets office

continued from page 1

mum of 8M bytes of random-access memory, Nelson said.

The client software runs on MS-DOS 80286- or 80386-based personal computers and supports AT&T's Desktop graphical user interface, which is based on Microsoft Corp.'s Microsoft Windows and was built using HP's NewWave object-oriented software.

NewWave contains an Object Management facility that enables users to share objects across the network. Objects are represented as screen icons and can consist of documents containing text, graphics and image elements stored on different systems on the LAN or on larger systems in enterprise-wide networks.

An object, for example, can represent a user spreadsheet data file as well as the spreadsheet program.

NewWave also makes it possible to represent current DOS applications as screen icons that can be manipulated by the user, Nelson said.

While the underlying technology is based on NewWave, Rhapsody adds two applications developed by AT&T Bell Laboratories engineers — the Task Manager and Meeting Manager — as well

as extensions to the desktop application software that is bundled with Rhapsody.

Network at the desktop

AT&T Task Manager and Meeting Manager are client/server groupware applications. Users can access either application by clicking onto the appropriate screen icon, which then brings up a Microsoft Windows program to communicate with the Unix server-based portion of the application.

Task Manager is designed to facilitate project management among groups of people on the network. Task Manager distributes tasks, as well as any documents that are necessary for the completion of tasks, among a work group and tracks the progress of the task and what action has resulted, Nelson said.

Meeting Manager allows users to set up meetings, schedule resources such as conference rooms, mail meeting materials and set up alternate meeting dates.

Meeting Manager provides a series of windows that allow users to create, reschedule, cancel and display status updates and any items associated with the meetings, Nelson said.

"A user can tentatively schedule a meeting and send the information to a specified group of

people. The work flow automation system within Rhapsody will take over, check users' calendars and verify the date or come up with an alternate date in the event the first date isn't viable," Nelson said.

Besides Meeting Manager and Task Manager, AT&T Bell Labs has also enhanced existing third-party software packages for use in Rhapsody.

Rhapsody includes bundled support for Lotus' Lotus 1-2-3 and Excel spreadsheets, WordPerfect Corp.'s WordPerfect, Microsoft's Word for Windows, Micrografx, Inc.'s GraphPlus, and Futuresoft, Inc.'s DynaComm. It also provides a common distributed data base from which users can share applications.

"We've taken existing software packages and made them more user-friendly by creating object-oriented functions for non-Windows-based applications such as WordPerfect," Nelson said.

The basic Rhapsody configuration, including software supporting 20 DOS workstations from a WGS 386 33-MHz server, costs \$8,500 per user. A 33-MHz WGS 6386 server with 300M bytes of hard disk costs \$70,000.

Nelson said AT&T will sell unbundled Rhapsody client software only to existing AT&T WGS users for \$3,000 per user. □

British Tel rolls out mgmt. plans

continued from page 6

ranging from mainframes to minicomputers. It will support alarm handling, fault diagnosis, performance management and security.

OSI/NM conformance

Although the "manager of managers" concept British Telecom is pursuing is similar to the approaches taken by AT&T and Digital Equipment Corp., British Telecom hopes to differentiate its offering by making it fully compatible with the net management specifications defined by the Open Systems Interconnection Network Management (OSI/NM) Forum.

British Telecom was a founding member of the OSI/NM Forum, a group dedicated to the de-

velopment and use of OSI network management products.

"It's probably the world's first system originally designed to use OSI management and object-oriented principles rather than one that has simply been adapted to incorporate these principles," said Graham Stanton, a British Telecom senior manager responsible for Concert.

Concert will be focused initially on managing value-added net services and then rounded out throughout the year, according to Mark Baker, BT Tymnet's president. Product trials could start as soon as the fourth quarter.

Among the few details divulged about Concert is that it will be built on an Oracle Corp. data base management system and Posix-conformant operating systems. The graphics-oriented user interface will be built on the X Window System standard. □

Talking LAN to LAN

continued from page 48

become clearer to users. X.400 is appropriate for connection to disparate nets, wide-area networks, and government or other nets that must conform with OSI standards. However, MHS is a low-cost solution that offers the immediate benefits of multiple, available products.

A question of ethics

Ethical issues will emerge in the future, such as the treatment of unsolicited messages or "junk" E-mail. Junk E-mail has the potential to negate the usefulness of E-mail in three ways: by tying up transmission paths, by eating up memory on networks and by discouraging users from checking their messages.

It has been hoped that the government will act quickly to protect such an important and vulnerable communications tool. E-mail is already covered under the Electronic Communications Privacy Act of 1986, and recent junk fax cases in the courts offer hope that the junk E-mail problem will be resolved before damage occurs.

Finally, E-mail features that more closely follow the way people naturally work will proliferate. For example, there are features that allow users to designate incoming mail from other users, such as an immediate superior, as important or to block unimportant mail, such as notices from annoying salespeople. Some packages allow users to designate certain E-mail messages as urgent. The danger in the latter system, however, is that the definition of urgent might not be consistent among users.

Gauging the future

Because E-mail is still a new form of communication, it is difficult to tell how valuable it will eventually become. The rapid acceptance of E-mail in the business community suggests that E-mail is an important productivity tool.

E-mail is valuable not only because it provides reliable, efficient, peer-to-peer communication, but also because it has the potential to integrate disparate systems. □

Shortest route between two LANs

continued from page 49

frame header, traffic overhead increases somewhat. The routing information field is between six- and 18-bytes long; for regularized frames, this amounts to a fractionally small overhead.

Also, the route discovery process generates network traffic. The amount of this traffic depends on the number of loops and redundant connections in the network topology.

A large number of connections means a large number of routes. Consequently, many copies of an all-routes broadcast frame will circulate on the network.

In practice, this means that to-

ken-ring network designers must limit the redundancy built into the network. However, the important point to remember is that a useful degree of redundancy is allowed.

In contrast, transparent spanning tree bridges must always configure themselves in a spanning tree topology. Therefore, optimal path choice and load sharing among parallel bridges is not possible with transparent bridges.

When used with upper-level software that supports it, source routing offers a rich set of routing and network management options. □

New 9800 boasts NetView link

continued from page 2

well as the 6742 and 6745 Flexible Network Exchange statistical multiplexer/packet switches.

Direct control of Codex equipment using NetView is offered through the new 9800 View feature, optional application software that runs on the 9800 workstation and the IBM host. The workstation software provides the connection between NetView and the 9800, bypassing IBM's Personal System/2-based NetView/PC software.

Codex already offers a direct connection to NetView for its 2600 Series modems through optional software called DualView. ("Codex forges a direct link to NetView," NW, May 15, 1989).

Unlike DualView, 9800 View does not require Codex's 2600 Series to emulate IBM modems and the Link Problem Determination Aids-2 protocol to communicate with NetView, said Stephen Mank, director of network management systems marketing. Emulating IBM modems sacrifices Codex modems' functional advantages, he claimed.

With 9800 View, the Codex modems communicate in native mode with NetView so they are able to provide more network management information than under DualView.

The host-based component of 9800 View, which runs as a NetView subtask, allows bidirec-

Letters

continued from page 31

business use of Enable Software, Inc.'s Higgins Group groupware product at American Centennial Insurance Co. cited in the article

— groupware can become a plaything rather than a productivity tool. This is a consideration that all current and would-be groupware developers should take seriously. For example, we recently eliminated an interactive, text-to-voice feature originally designed into beta versions of Right Hand Man Version 5.0.

We had two reasons for doing this: We were concerned that this feature could indeed become a

toy rather than a tool; and final research and user feedback indicated that, especially since everyone owns a telephone, interactive voice was not a critical requirement.

Finally, just for the record, isn't it possible that, just as in any technology-driven work environment changes, the "psychological hurdle" to be overcome by LAN users is the LAN itself? And isn't it equally possible that easy-to-use, fully functioning groupware can actually boost LAN sales and usage?

John Robert Martinson
President
Futuresoft, Inc.
Metairie, La.

IBM strategists discuss dist. DBMS

continued from page 1

their company will also build an SAA-compatible relational data base for its RISC System/6000 workstations (see "IBM building SQL DBMS for RISC 6000," page 52).

Is IBM's distributed data base strategy a foundation for client/server computing?

Van den Berg: The architecture we are putting in place applies equally to all four SAA data base managers. Any one of them can participate as a server or a requester to any of the others.



IBM's Santa Teresa Laboratory software development facility

That isn't how we went into this though. At first, we thought people with PS/2s or workstations would only want to pull data down from the mainframe. But some DB2 users said there is a lot of data on PS/2s or workstations that they want to pull up to the mainframe.

The goal is to provide standard SQL across all four data base environments. This will give users application portability and let us transfer technology from one environment to another. A more compelling reason to do this is to create a solid base for connectivity.

When you speak the same SQL on different products, it makes for efficient translation back and forth.

Morgan: The first release of distributed support will have a common SQL so users don't have to know where data is. But data base administrators will have to make sure the data that people need is all in one place. As we move to different stages, even data base administrators won't have to worry that much about where data resides.

Initially, we're focusing on giving the end user the ability to access data wherever it resides; then we'll move on to providing other tools that ease management of the data.

We also need to make sure users understand what they can get out of [a distributed data base] so they don't try to use it for certain mission-critical [applications] first. For example, I probably don't want to use the first release for something like an automated teller machine application that requires high performance because the orientation of the first

release is not high performance. The orientation is to provide access to data that is in different places.

Are applications portable from one SAA environment to another today?

Van den Berg: If users write an application that conforms to what is published in the SAA manual, then it is portable across all four environments.

In a few cases, the manual defines an SAA standard that a particular product doesn't support

or supports in a different way. So the manual tells [you] that if you're writing an application that you want to be portable across these environments, steer away from writing the particular SQL statement in this way.

How important is portability to users?

Van den Berg: Many users are much more interested in the broader question of distributed data access. That is really where we are putting our focus.

How many users today are interested in implementing distributed data bases?

Morgan: More than some people think and less than some of us would like to think. A lot of large customers, like banks, aerospace companies, retailers and insurance companies, have told us they have applications they want to distribute. Some of them want the capability [so] quickly that they are going to be doing their own work.

There are a lot of reasons why customers want to distribute data. Organizations are distributed either geographically or logically in terms of internal departments. [Distributed data bases] give users the ability to manage data closer to where it's used and with a processor that's large enough or small enough to support the specific application.

Also, customers have a mix of equipment and need to get to data wherever it is. Today, that's not an easy thing to do. If I'm on an MVS machine and I want to get at data on a VM machine, I either have to get somebody to download it to me or I have to log off MVS, log onto VM, extract the data

and download it myself.

Our vision is that wherever I happen to be, it appears to me as though all the data is on my machine. It's a very big effort, so we're going to have to take it in steps.

Zagelow: People don't see a lot of the data distribution that's already going on. You've got people sharing copies and shipping files back and forth — all totally manual, all unmanaged. Everybody that has a PC on the desk is getting data from somewhere, even if they're rekeying the data off hard copy to put it into a spreadsheet.

The fact that we haven't delivered the capability is a major inhibitor toward most of our shops moving forward with distributed data base technology.

Do any of the four data base management systems defined under SAA currently support any distributed data base functionality?

Morgan: Three of them can already distribute data among themselves — DB2 to DB2, OS/2 to OS/2, or SQL/DS to SQL/DS.

Zagelow: The current thrust now is to develop any-to-any heterogeneous architecture. That announcement will happen before the end of the year.

SQL/400 to SQL/400 can't be done today?

Morgan: You cannot use SQL to do that right now. But the

A remote request is available in non-data base products like [Enhanced Communications Facility. ECF is a software product that lets DOS-based microcomputers access host data.] This will not be done directly in SAA DBMSs. It will likely be an add-on product. It lets users build a single SQL statement that is processed at a remote DBMS and supports read-only access to data.

With a remote unit of work, multiple SQL statements are packaged together to read data residing on one machine, do some analysis of that data and make updates based on what was read. A distributed unit of work removes the restriction of not being able to read data residing on machines at multiple sites. But this still has a restriction in that a single SQL statement has to be processed at one site.

A distributed request lifts that. Now a user can have a single SQL statement processed at multiple sites. This is probably the hardest thing to do. Not because we don't know how to find the data. Not because we don't know how to move the data from here to there. The major problem is being able to efficiently and effectively use the network resources in optimizing that SQL statement.

Are you talking about a distributed query optimizer?

Morgan: Yes. If I want to do a multisite join [to move data from different machines to one ma-

Morgan: There are also four ways to distribute data. They are called extract, snapshot, replicated data and distributed tables. An example of extract is in our DXT [Data Extract] product, which copies data from one place and puts it in relational format somewhere else. A key element is that customers have to manage this process manually. They have to



IBM's George Zagelow

remember where the data is, and they need to refresh the copy in order to reflect updates.

Snapshot can automate much of what extract users must do manually. A customer defines what data has to be copied and when to copy it. The DBMS remembers when to do that. Snapshot can also be programmed to copy only the data that has changed or all of it. But snapshot still provides read-only copies.

Replicated data can be read and changed. With replicated data, the DBMS has to figure out how to reflect a change made to one replicated data base on all the others.

With distributed tables, users can break a data table up and put pieces of it in different locations. For example, a bank may have checking account data in three different tables at different sites.

What knows where all the data is and how to get to it?

Morgan: You define a data object, like a table name, in the application. Then the data base administrator tells the DBMS that these objects are in these locations. We'll probably do that with a naming structure so we don't have to define every single table to every single DBMS.

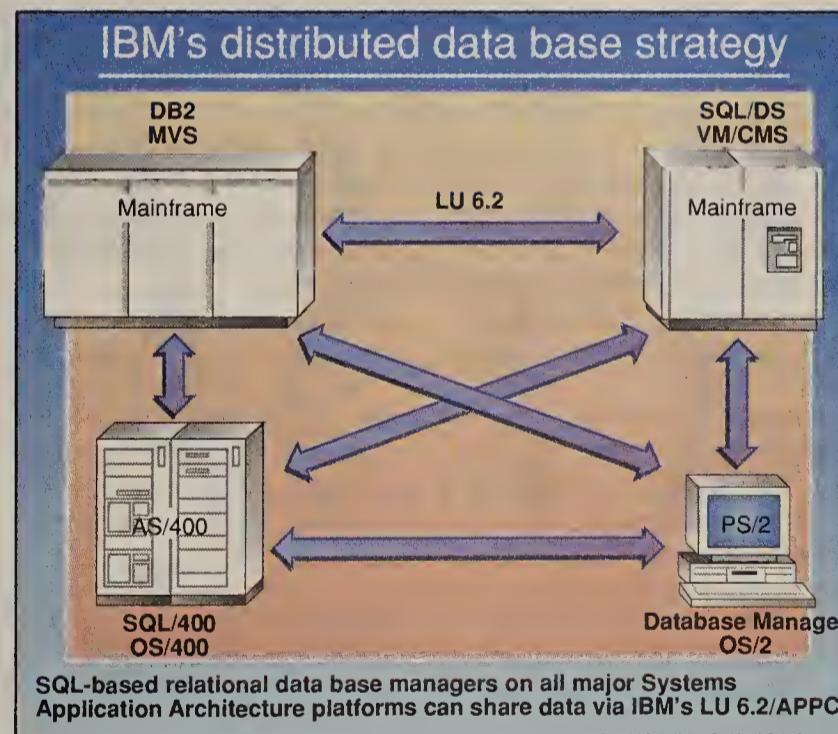
Will that require some a distributed directory?

Zagelow: The long-term direction is that you need a distributed directory. But the real decision hasn't been made as to what the right solution will be.

What about links to non-IBM data bases?

Morgan: There are two basic ways to interoperate with non-IBM data bases: gateway or architected. Some competitors selling some form of distributed data bases have gateways to DB2. But

(continued on page 52)



OS/400 data base can distribute data to other OS/400 data bases using a native interface.

What will users be able to do with a distributed data base?

Morgan: There are two main capabilities. There is distributed access — getting data from other systems — and there is distributed data — sending copies of data to different systems.

Distributed access can be done four ways: remote request, remote unit of work, distributed unit of work and distributed request.

chine for processing] and I've got 10 rows of data at one site and 1,000 at another, it's pretty obvious what to do. We move the 10 to the 1,000, do the join and send the result to the user.

But if I had 500 here and 600 there, it no longer becomes obvious what to do. It may appear it would be best to move the 500 to the 600. But if the machine with the 600 is busy, maybe it would be better to move the 600 to the 500 to get better overall network efficiency.

What about distributing data?

IBM strategists discuss

continued from page 51

gateways appear to the DBMS as an application, not another DBMS. I can't make sure that actions on one side of the gateway happen consistently with actions on the other side of the gateway.

With a gateway, you must also make sure the network protocols can handle failures. The DBMS needs to know if a line goes down so it can release locks on data records retrieved over the gateway. Otherwise, those records will remain locked. We've chosen not to implement gateways. We will implement architected peer-to-peer communications between DBMSs.

Zagelow: That's a key reason why LU 6.2 is in the equation. LU 6.2 can deliver failure notices on either side of the line.

Is there a plan to merge SQL/DS and DB2?

Van den Berg: We have a different strategy than other vendors. Other vendors take their source code and port it from one environment to another and then surround that with code that makes it work better [in the other environment].

SQL/DS and DB2 are built to work best in their own operating system environments. Where we try to get commonality is in the user interfaces for those products. That is where SAA comes in. □

FDDI vendors to fight Soderblom

continued from page 7

alty payments. But it would be a different story if 20 companies decided to fight him together."

The president of another FDDI company, who requested anonymity, backed up Chesson. "United we stand and divided we fall. There has never been a united front aligned against Soderblom. I'm all for getting a war chest together to settle this issue once and for all," he said.

"I definitely want to see Soderblom's advance halted," said another executive at a West Coast

ing to court papers filed in February in the Federal District Court.

Chesson said FDDI vendors are concerned because Soderblom will charge larger royalties for higher speed FDDI network components.

"Soderblom is trying to extract a bigger premium from the FDDI vendors [than he's getting from token-ring companies] based on the higher bandwidth. It's outrageous," he said.

Soderblom confirmed that his current licensing structure calls for different royalty payments based on the speed of the net.

For networks up to 16M bit/sec, the royalty is 3.125% on each token-ring adapter but not more than \$50 per adapter, Soderblom said. For higher speed nets, the royalty on adapter cards priced less than \$1,000 is 3.5%.

For adapters costing more than \$1,000, Soderblom gets a 2.65% royalty plus an additional \$8.50 on each adapter, with the total royalty on a single adapter not to exceed \$275. Soderblom offers quantity discounts to vendors.

Soderblom contends that he is sensitive to criticism that, at times over the past several years, his royalty fees were too high.

"We've changed our payment structure four or five times over the past few years in response to valid criticism from our licensees. Dialogue is certainly more productive than the verbal potshots that some people in the industry are taking lately," he said.

"Fibronics [International, Inc.] and a couple of other FDDI vendors have already signed agreements with me, and we're on the verge of signing three more," Soderblom added.

He declined to divulge whether he has a licensing agreement or is negotiating one with Advanced Micro Devices, Inc., which manufactures the FDDI Supernet chipset found on most FDDI adapters.

The FDDI vendors said they will discuss the Soderblom patent issue at the next ANSI X3T9.5 committee meeting later this month in Florida. □

IBM readies dist. DBMS tools

continued from page 1

Cycle, which was announced in September. With AD/Cycle, IBM explained the philosophy guiding its efforts in the area of application development and introduced development tools.

According to the executives, distributed data base control tools are a top priority for IBM's largest customers. These users have expressed concern about implementing distributed data bases without a clear plan for centrally managing them and without tools designed specifically to monitor and control them — tools that, for the most part, do not exist today.

IBM will introduce some of these tools when it unveils its distributed data base management plan. Officials declined to offer details of the products to be unveiled but said tools for problem determination, security administration, operations management and configuration management are of the highest priority.

“We've had a habit of delivering [management] tools later than the functions."



"We'll show our general architectural direction, pieces we've built and pieces that other vendors have built," said George Zagelow, manager of architecture and standards, enterprise data solutions for the programming systems group.

Norris van den Berg, manager of strategy and market planning for the programming systems group, added "We've had a habit of delivering [management] tools later than the functions. We can't do that with distributed data base.

IBM building SQL DBMS for RISC 6000

SAN JOSE, Calif. — IBM officials last week said the company is developing an SQL-compliant relational data base management system for its Unix-based RISC System/6000 machines that will be able to exchange data with IBM DBMSs on other processors.

Data base experts at IBM's Santa Teresa Laboratory here said the company is building a Systems Application Architecture (SAA)-based DBMS to run under AIX, IBM's version of Unix, on the RISC System/6000 workstations and servers announced in February. The product will be able to exchange information with IBM's DB2 and

SQL/DS on mainframes, SQL/400 on the Application System/400 and the Database Manager in OS/2 Extended Edition.

"We'll have a relational data base in our AIX environments that uses the same technology and will interoperate with these products," said Norris van den Berg, manager of strategy and market planning for the programming systems group.

He declined to say when IBM will deliver the AIX-based product but acknowledged that IBM debated whether to develop it internally or use technology from another vendor.

"The more we looked at it, the more we felt it was important

hind the creation of the distributed data base control architecture.

"Every customer has said, 'Don't make me hire a lot of people to deal with distributed. Give me the tools. Allow me to centralize the operation,'" Morgan said. "Because they are dealing with a lot of environments, they want the tools to be consistent and cooperative. They say 'Don't make me talk to OS/2 differently than I talk to DB2.'"

“IBM needs to provide heterogeneous data base-to-data base capabilities."



Morgan said IBM's architecture will cover two broad areas: operations and alerts. Operations will involve issuing commands from a workstation to control data bases running on network nodes. For example, an administrator could issue commands to recover a data base on a remote node. Alerts will involve notifying the central site of problems in the network.

"Today, hardware is the only thing that generates alerts that are managed by NetView," Morgan said. "But there will need to be support for software alerts as well. The data bases will issue the alerts. You won't have to rely on an order entry clerk or some executive looking at a workstation to figure out what to do when there's an error. It will automatically be sent up to someone who can deal with it," he said.

Morgan said users want the data base control tools integrated with their current network management system. "If the data bases support the interfaces to that architecture, they will fit into that [management] environment," he said. □

tant to use our own technology, in which we have a lot of pride. Also it gives us interoperability between AIX and SAA at the level of functionality and performance that we wanted," van den Berg said. He added that a major issue to be resolved in communications between the AIX product and other IBM DBMSs is supporting IBM's LU 6.2 over Transmission Control Protocol/Internet Protocol links.

"It's possible that in the first release we may not have good interoperability between the two," said IBM Senior Programmer Larry Morgan. "But we are working on that."

— John Gallant



Real-World ACD.

Better service? Everyone salutes the idea. But in the real world, how do you make it fly? For the airline industry, the answer comes from their local telephone company. Using AT&T Network Systems Automatic Call Distribution (ACD) equipment, local telephone companies can provide airlines with a better way to answer their customers' calls. The incoming calls of their most important customers fly non-stop to their most experienced agents. And calls from less frequent flyers? They're answered quicker too. ACD programs can help airlines land more customers. See how they can help your business take off. Call your local telephone company marketing representative or call 1 800 638-7978, ext. 3310.

**You and Your
Local Phone Companies**



AT&T
Network Systems

PC LANs barely evident at confab

continued from page 6

now," said David Chamberlain, a product marketing director for Computer Associates International, Inc., the world's largest independent software company.

While the big-name data base vendors lock horns over such issues as coming up with a standard SQL and interface or the role of object-oriented data bases, some relative unknowns are rising to the challenge and developing innovative ways to merge the LAN and data base worlds.

One of the most interesting products in this category that was demonstrated at the show was Topic, a text search and retrieval system from Verity, Inc. of Mountain View, Calif. Topic is based on a distributed client/server architecture and runs across standard network environments.

Both the client and server portions of the software can run on DOS-based personal computers; DEC's VAX/VMS and Ultrix systems; and Unix systems from Sun Microsystems, Inc., MIPS Computer Systems, Inc., Pyramid Technology Corp. and The Santa

Cruz Operation, Inc. These systems can be linked via any net that supports remote file sharing, including Novell's NetWare, Microsoft Corp.'s LAN Manager and Sun's Network File System.

Like other text retrieval systems, Topic lets users locate documents that have been created in a variety of applications and are scattered across a network. What is unique about Topic is that it goes beyond traditional Boolean and key-word searches, which find only exact matches, and applies expert system technology to analyze content and match ideas.

There is also an SQL-Bridge product that links Topic to SQL-based relational data base management systems from Sybase, Inc., Ingres Corp., Oracle Corp. and Informix, Inc., enabling the two types of data bases to exchange information.

This provides users with a single window into both structured and unstructured data. The product can also be employed to refine traditional structured data searches by doing content analysis of text in the relational DBMS files.

The product shows how an in-place heterogeneous computer

network can be turned into a powerful mechanism for providing the desktop with a window into corporate data.

"If you are willing to change platforms, vendors can offer you the moon and maybe even deliver it," said Leslie Squires, president of Word Jenny, Inc., a data base consultancy in Wellesley Hills, Mass., and a speaker at DB/Expo. "But tearing up what you already have just isn't an option for most companies."

"This whole idea of multiple front ends is really critical," Squires said. "You should be able to view a corporate data base from within any application."

One of the problems that has prevented developers from building this kind of functionality into front-end applications is the existence of so many dialects of SQL.

According to Jim Brink, president of Battelle, Inc., a software company in Columbus, Ohio, that publishes a personal computer-based tool for querying relational DBMSs, "It takes less time to deal with the nuances of the various SQL dialects than it does to interpret the data that comes back — in streams, characters or whatever — from the data bases." □

Router firms rally round

continued from page 2

most vendors support some form of IBM's High-Level Data Link Control, they do not include the same fields in their protocol, which is the principal barrier to interoperability.

All vendors' routers can interoperate within Ethernet, token-ring or Fiber Distributed Data Interface environments. They cannot, however, interoperate over serial dial-up or leased lines because no standard for high-speed synchronous communications has been defined yet.

"If you have a Cisco [router] and you want to join a network built around Proteon's [routers], that's too bad. So much for evaluating vendors," said Rick Adams, president of Falls Church, Va.-based UUNET Communications Services, Inc., which offers an IP-based public network service that requires a Cisco Systems router for high-speed net access.

For example, some vendors do not include information in their HDLC header that tells the receiving device which protocol is encapsulated within HDLC, while other vendors do include this.

PPP would define a standard method for encapsulating IP and, in later releases, other protocols such as Open Systems Interconnection, Xerox Corp.'s Xerox Network Systems and Digital Equipment Corp.'s DECnet.

PPP would also replace the Serial Line Interface Protocol (SLIP), an antiquated protocol used for asynchronous IP communications. It is used on hardware devices such as personal computers to provide low-speed asynchronous connectivity to the Internet over serial lines.

Unlike SLIP, PPP will perform addressing, configuration for connected devices and link quality monitoring, according to Drew Perkins, vice-president of InterStream, Inc., a Pittsburgh-based TCP/IP vendor. Perkins is also an IETF participant and former manager of network development at Carnegie-Mellon University in Pittsburgh.

"PPP makes it easy in dial-up situations if a user has a PC at home and doesn't want to configure an Internet address," Perkins said. SLIP is most commonly used in computer-to-router or computer-to-computer setups.

The proposed protocol standard also supports high-speed synchronous connections at speeds up to T-1, whereas SLIP only supported a maximum asynchronous speed of 19.2K bit/sec.

Although users and vendors agree that PPP promises many benefits, there are still issues to be resolved.

"The two big ifs are whether it works as it's supposed to work and [whether it] is widely implemented," said Kevin Oberman, network manager for Lawrence Livermore National Laboratory's engineering network. "If customers decide they want it, I guarantee vendors will implement it."

Lawrence Livermore Lab recently began stipulating PPP support in its router procurement specifications.

Widespread implementation of PPP can only help users, who are increasingly implementing internetworking products, according to Phil Demar, external network manager and manager of the High Energy Physics Network at Fermi National Accelerator Laboratory in Batavia, Ill.

"It's a case of users being able to use products they've already got, whereas in the past, they might have had the wrong kind of router to talk to somebody else," Demar said.

As PPP is implemented, it will force vendors to differentiate their products on price and performance features, according to William Seifert, vice-president of strategic planning for Bedford, Mass.-based Wellfleet Communications, Inc. In the past, support for a variety of protocols was one way in which vendors distinguished their offerings. □

Data base offerings bow

SAN FRANCISCO — Users that want their familiar personal computer applications to provide easy access to corporate data should take note of new products that Lotus Development Corp. and Ashton-Tate Corp. demonstrated at DB/Expo '90 here last week.

Lotus used the occasion to announce the availability of two add-on products that connect Lotus 1-2-3 spreadsheets via a local-area network to data stored in the Microsoft Corp./Sybase, Inc. SQL Server.

Ashton-Tate's dBase front end to SQL Server is still not finished, but it is shipping software linking dBase applications to IBM mainframe data bases.

Because of 1-2-3's status as the world's most widely used personal computer business application, the new Lotus releases — called Lotus DataLens Driver for SQL Server and Lotus@SQL — represent a watershed for SQL Server.

Microsoft introduced the data base engine more than two years ago, flanked by a host of major software houses that promised to turn existing products into SQL Server front ends. However, most of those promises have been unfulfilled.

"Vendors have been very slow at delivering their front ends, and that in turn has slowed the acceptance of SQL Server," said Richard Finkelstein, president of Performance Computing, Inc., a data base consultancy in Chicago.

Dwayne Walker, SQL Server product manager at Microsoft, said, "We all underestimated both the level of transparency [between front ends and SQL Server] demanded by users and the problems of mapping existing products to a new data base engine." Walker said the problems have largely been solved and indicated that a number of SQL Server front ends will reach the market soon.

The Lotus DataLens Driver for SQL Server links 1-2-3 Version 3.0 or 1-2-3/G to SQL Server, while Lotus@SQL does the same for 1-2-3 Versions 2.01 and 2.2. The products, priced at \$75 each, enable 1-2-3 users to retrieve data from SQL Server and move it into their spreadsheets. Using familiar 1-2-3 commands, they can query the data base, insert, delete or update data base records, and create or delete data base tables.

Ashton-Tate has extended the reach of dBase into the IBM mainframe environment with the release of dBase Direct 3270. The product lets users perform 3270 terminal operations within a dBase application, moving information from DB2, IMS or VSAM data bases into dBase files, or vice versa.

The software, which operates across standard 3270 terminal-emulation boards, is priced at \$595. A LAN gateway version is forthcoming, said Shelley Symonds, product manager for Ashton-Tate. □

— Susan Breidenbach

US Sprint to unveil int'l VPN

continued from page 2

ing-line identification, call forwarding and ring-again services, which keep redialing a busy number until someone answers.

International transmissions will be routed over undersea fiber-optic cables, and users will be required to maintain T-1 or European T-1 links from their premises to the points of presence of the respective carriers.

Within the next few years, US Sprint hopes to provide IVPN services to Canada, Ireland, Italy, the Netherlands and Spain.

"User interest in this kind of thing is very high," said Stanley Welland, manager of corporate telecommunications at the General Electric Co. in Stamford, Conn. "With all the difficulties you have now with international networking, the ability to use more of these services abroad is just dynamite."

Limited market

International virtual network services are limited today. No carrier outside of the U.S. currently offers virtual network services, although several say they plan to roll them out in the next few years.

AT&T is the only U.S. carrier with an international virtual net service. However, that offering, dubbed Global Software-Defined Network (SDN), only serves the U.K. Users access Global SDN via dedicated links to a British Telecommunications PLC gateway switch in London.

MCI Communications Corp. plans to roll out a similar interna-

tional virtual network service in the U.K. by year end.

US Sprint will let users access IVPN services in virtually every major city in England, Burgess said. The company may also be the first carrier with an international virtual network offering in the Pacific Rim, although AT&T is planning to cut over Global SDN links to gateway switches in Australia and Japan by year end.

Perhaps most significantly, US Sprint will allow users to reconfigure their IVPN, check performance statistics and receive call detail records from a single IVPN management system in the U.S., Burgess said. AT&T and MCI are asking users to work with the foreign carriers to manage the far ends of their services.

"To my mind, the network management difference could be really important," said John Morrison, vice-president of voice information services at Sears Technology Services, Inc. in Schaumburg, Ill.

"One of the key things you're looking for in an international virtual network is [a way to avoid dealing] with the foreign carrier," he added.

Both AT&T and MCI say they will improve the functionality and reach of their international virtual network services over time, and some users say that eventually the service differences will only be minor.

"What we're really seeing is the beginning of a market that will become very robust," Welland said. "In two or three years, users will be able to start stringing up hybrid networks internationally as easily as they do here." □

ICA report blasts RBHC bid

continued from page 1

alized countries. That premise is attacked in the ICA/CFA report.

"We're No. 1, vis-a-vis the rest of the world," Moir said at a press conference here. "The Bells' No. 2 campaign is nothing but a scare tactic. They're trying to scare people into giving them more flexibility."

The report cites several examples of what Moir calls RBHC-sponsored disinformation.

One is an ad that has run in several magazines carrying the bold headline "If You Like Being No. 2, You'll Love America's Telecommunications Policy." The ad then states that foreign competitors are making "further inroads" into U.S. communications markets, while the RBHCs must "sit on the sidelines" until Congress can "wrest policy control from the courts."

The report maintains that the data backing up such an assertion is erroneous. The report also chides the carriers for putting misleading data into public filings to show that foreign carriers are investing more in advanced technologies.

According to the report, much of this information has been compiled by William Davidson, an RBHC consultant and professor at the University of Southern California in Los Angeles. In several public filings, Davidson has argued that foreign carriers are spending more per access line on

advanced network technologies than U.S. carriers.

Given these investments, Davidson concluded that "Japan, France and other nations will deploy modern public networks 10 to 20 years sooner than the U.S."

Davidson recommends that the RBHCs be allowed a higher rate of return to enable them to boost network investment.

But ETI Vice-President Page Montgomery disputed these claims, saying that Davidson erred by including foreign carrier spending on private branch exchanges, inside wiring, handsets and other customer premises equipment that U.S. carriers do not provide to users. Montgomery called Davidson's figures "an apples-to-oranges comparison."

The report concluded that at least 40% of the foreign public telephone operators' investment cited by Davidson fell into this category. The study even questioned how Davidson handled currency conversions.

It stated, "The notion of a lagging U.S. telecommunications investment level is nothing more than a transparent fiction."

Montgomery added that "the filings by Davidson have never been challenged before. The regional Bells are not spending less than their counterparts in other countries. They're spending more. We have to be careful about how conventional wisdom is formed." He noted that if a phrase — such as "second-class network" — is repeated often enough, it can become an unques-

tional perception.

Carrier officials and Davidson strongly disagreed with the report's assertions.

"No, obviously we're not [leading a disinformation campaign]," said a US West, Inc. spokesman. "We're just trying to show American consumers the irony that the country where the telephone was invented is staggering and stumbling into the information age."

The spokesman said that any money spent on public relations by US West is "funded by shareholders, not ratepayers."

Davidson conceded that his research included "nonnetwork investment on the American side, including real estate, cellular paging and sales of equipment by affiliates." But he also defended his methodology, saying he had to use aggregated figures for both American and foreign carriers. Davidson said he is soon coming out with network-only figures that will reinforce his claims.

"I'm sure we could call into question a lot of their figures too," the US West spokesman said. "That's one of the things you get into: My report says this, your report says that. But when you put all the reports aside, the American consumer is beginning to see what they're missing by having seven of the country's most creative and innovative companies sit on the sidelines."

Barton Crockett contributed to this article.

IBM 3745 to support T-3, FDDI

continued from page 6

director of IBM's La Gaude Laboratory.

The 3745 will support both Basic Rate Interfaces (BRI) and PRIs to Integrated Services Digital Networks, Granatino said. Both will be supported by a new line scanner, integral to the 3745, and external interfaces similar to the existing 3745 line interface couplers, he said.

This will let users attach BRI and PRI links directly to the 3745 rather than through a stand-alone adapter such as the existing IBM 7820. The 7820 only sup-

choose one of these technologies for the 3745 because the issue involves larger Systems Network Architecture questions and, as such, is under study in Raleigh, N.C., Lebizay said.

Another 3745 feature dependent on developments at other IBM sites is an interface for 100M bit/sec FDDI local-area networks. The FDDI standard is not final, and IBM has yet to announce an adapter that engineers here could use to integrate FDDI support into the 3745.

However, IBM does have a



IBM's 3745 research and development site in La Gaude, France.

ports BRI and is managed via NetView/PC, whereas an integral 3745 ISDN connection could be managed directly from NetView.

ISDN support on the 3745 would let users employ the service for short bulk data transfers, to back up leased-lines or for integrated voice/data applications.

As with all the products under development, Granatino declined to say when the ISDN interfaces are expected to be announced or be available.

As part of its strategy to support all available carrier services and emerging high-bandwidth applications, Granatino said IBM is working on a 3745 interface for 45M bit/sec fiber-optic T-3 services and is studying the feasibility of supporting a Synchronous Optical Network (SONET) Optical Carrier-3 (OC-3) interface.

SONET is an emerging standard that defines transmission speeds of 51.84M bit/sec and higher over fiber-optic cable. OC-3 defines a transmission speed of 155.52M bit/sec.

Such high-speed links will require the front end to support some type of fast packet switching architecture, said Gerry Lebizay, high-tech manager for IBM's telecommunications group here. Fast packet provides bandwidth on demand instead of breaking down the link capacity into a fixed number of channels.

There are several flavors of fast packet technology under development and in various stages of the standards process, including Asynchronous Transfer Mode and Frame Relay. IBM has yet to

working FDDI prototype at the National Aeronautics and Space Administration and has indicated that it plans to announce FDDI products this fall ("FDDI at the final frontier; IBM networks space station," NW, Jan. 15).

Granatino declined to say how long it would take to integrate an FDDI adapter into the 3745 once the adapter is available. It took more than 12 months to develop the Token-Ring Interface Coupler (TIC) to link Token-Ring LANs to the 3745 after IBM came out with its Token-Ring LAN adapters, but Granatino said that does not constitute a pattern.

Although IBM executives here repeatedly stressed the company's commitment to providing additional LAN links to the 3745, Granatino said the company has no definite plans to support an integral Ethernet interface.

"Today, IBM supports Ethernet through the 3172," which is a bridging device that links an Ethernet directly to an IBM host, he said. "We are now assessing the need to provide [Ethernet] access through more than that."

Granatino also said IBM has no plans to introduce a fault-tolerant architecture for the 3745, a feature analysts have said would make it more reliable.

IBM contends that the 3745 has other features that provide end-to-end link reliability, including dynamic redundancy of TICs and scanners, and concurrent maintenance, which lets users repair 3745 adapters without disrupting the operation of the entire machine.

Voice mail gives Travelers edge

continued from page 7

information application worked because customers wanted very basic information, they wanted it quickly and they wanted [the data] after normal business hours," he said.

The firm has already installed 30 voice response units, some dedicated to one customer and others shared among many customers. The company expects that number to grow to 45 by year

use it. We just don't want the calls and don't have time to play telephone tag," Bender said.

Travelers is one of the first U.S. firms to use intercompany voice mail networking. It has linked its net to AT&T's internal Audix voice system to streamline communications between Travelers technicians and its AT&T national accounts team.

Travelers uses the link to ask

number of carriers, mailboxes on its voice mail network. "These agents don't have to sell our insurance but giving them mailboxes on our system makes it easier to do business with Travelers," Bender said.

Bender said voice mail has increased overall worker productivity 20% to 30% and has increased the number of contacts employees make with other employees and outside firms by 20% to 30%.

Bender told attendees that widespread acceptance and use of voice mail will force company-wide cultural changes that tend to boost worker efficiency. "Voice mail became part of Travelers' culture by extending the typical 9-to-5 workday well on into the evening," he said.

Travelers employees that do not want to disturb coworkers with after-hours telephone calls send them voice messages instead.

"People were leaving messages for other employees at 8 p.m. The [recipients] were picking up the messages a half hour later and sending responses one hour later," Bender recalled. "Now we have company executives that get upset if employees don't pick up their messages at night and during the weekend."

end, Bender said. One of Travelers' clients sends roughly 30,000 calls a month to its dedicated voice response unit.

Bender and several other speakers at the show said their companies are giving business partners mailboxes on their voice mail systems to simplify communications.

"Any vendor that wants to do business with Travelers has to have a mailbox on our system and

AT&T technical questions about products and services, set up meetings and trips, and simplify project management. "With project management, we use the [link] to make sure we're on the same [track]. This sharply reduces the amount of time it takes to complete all projects," Bender explained.

Travelers has also given independent insurance agents, who typically sell insurance for a

Voice mail became part of Travelers' culture by extending the 9-to-5 workday into the evening."

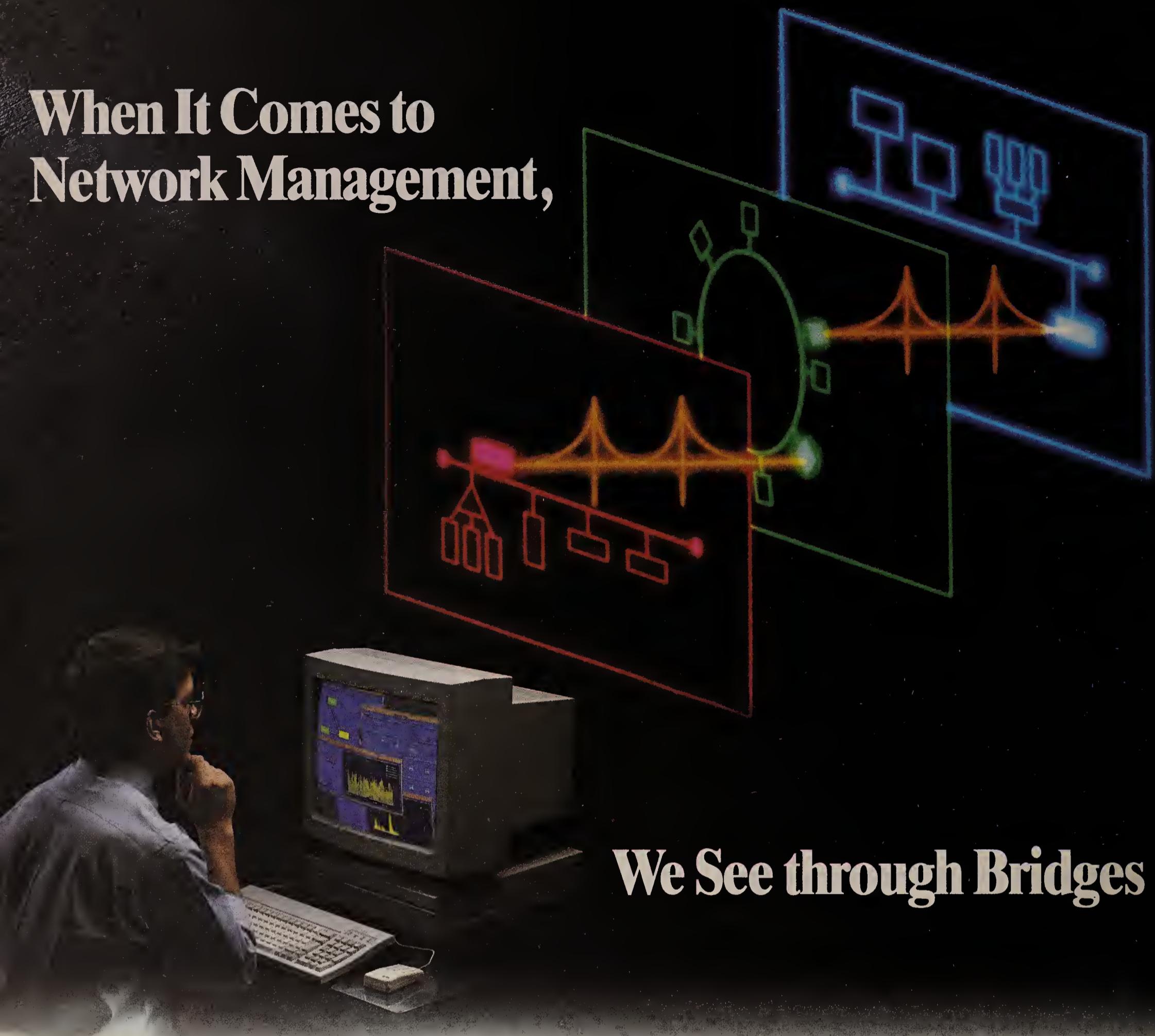
▲▲▲

end, Bender said. One of Travelers' clients sends roughly 30,000 calls a month to its dedicated voice response unit.

Bender and several other speakers at the show said their companies are giving business partners mailboxes on their voice mail systems to simplify communications.

"Any vendor that wants to do business with Travelers has to have a mailbox on our system and

When It Comes to Network Management,



We See through Bridges

Imagine seeing all your network activity from one segment through to another and beyond. That's total network-wide visibility through bridges, routers and T1s. That's what you need for effective management and control. And that's what LANCE™ gives you.

Industry Standard?

Absolutely! LANCE™ is a true SNMP-based Multi-segment Network Management System—not just another "enhanced" hardware monitoring system. LANCE communicates directly via SNMP with distributed probe collectors and other SNMP-based agents. Now and in the future, you can monitor your entire diverse, multi-vendor environment. No problem!

Alarm Options?

All of them. LANCE keeps you informed of

all network activity with several alarm notification options. User defined alarm criteria insures the system advises you before the user complains.

Long-term Trend Analysis?

Of course! Operating conditions, traffic flow, peak load demands—LANCE lets you see all the information you need from a single workstation point-of-view, presented in either DEC windows or X-windows. So now you can visualize your entire network through any time selectable period. Analysis of a single network node to full and inter-segment network activity. Now you can be proactive!

LANCE and you.

Network troubleshooter? Use LANCE to diagnose and fix problems. Network administrator? Foresee needs and prevent

any problems. Information Officer? Measure effectiveness and optimize your network's ROI. LANCE does it all!

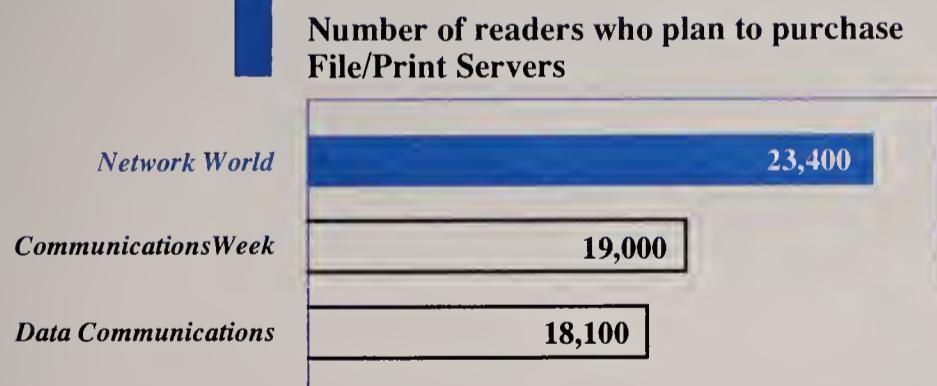
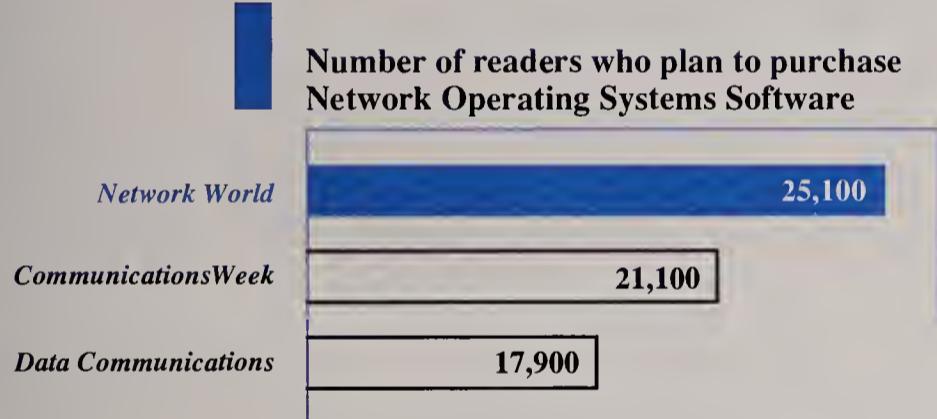
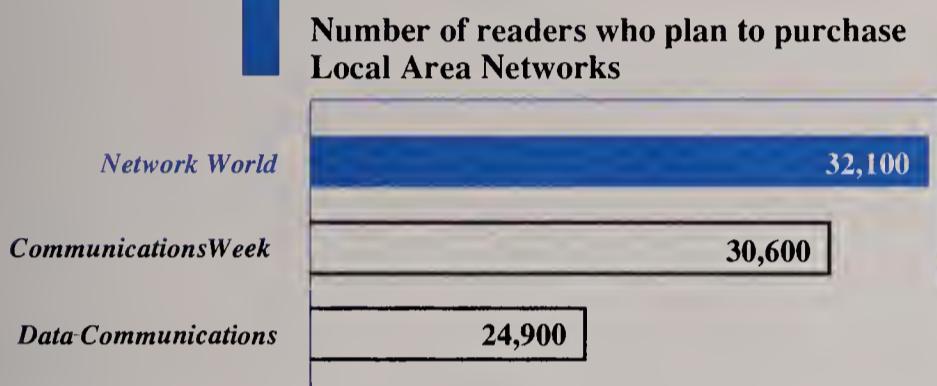
For a closer look at the one Multi-Segment Management system that lets you see the whole picture, call Micro Technology, the leader in designing and manufacturing enhancement products for the VMS and UNIX environment at (800) 999-9MTI.



Micro Technology

5065 East Hunter Ave., Anaheim, CA 92807
(714) 970-0300 or (800) 999-9MTI
European Headquarters:
Munich, West Germany Tel: 089 470 8191

Network World reaches more people planning to purchase networking products THAN *CommunicationsWeek* AND *Data Communications*



Source: IntelliQuest MediaTrack (1989)

For a copy of *Network World's* IntelliQuest Summary call
Evilee Lasker, Marketing Manager at 1-800-622-1108 today!

NETWORK WORLD

When It Comes to Network Management,



We See through Bridges

Imagine seeing all your network activity from one segment through to another and beyond. That's total network-wide visibility through bridges, routers and T1s. That's what you need for effective management and control. And that's what LANCE™ gives you.

Industry Standard?

Absolutely! LANCE™ is a true SNMP-based Multi-segment Network Management System—not just another "enhanced" hardware monitoring system. LANCE communicates directly via SNMP with distributed probe collectors and other SNMP-based agents. Now and in the future, you can monitor your entire diverse, multi-vendor environment. No problem!

Alarm Options?

All of them. LANCE keeps you informed of

all network activity with several alarm notification options. User defined alarm criteria insures the system advises you before the user complains.

Long-term Trend Analysis?

Of course! Operating conditions, traffic flow, peak load demands—LANCE lets you see all the information you need from a single workstation point-of-view, presented in either DEC windows or X-windows. So now you can visualize your entire network through any time selectable period. Analysis of a single network node to full and inter-segment network activity. Now you can be proactive!

LANCE and you.

Network troubleshooter? Use LANCE to diagnose and fix problems. Network administrator? Foresee needs and prevent

any problems. Information Officer? Measure effectiveness and optimize your network's ROI. LANCE does it all!

For a closer look at the one Multi-Segment Management system that lets you see the whole picture, call **Micro Technology**, the leader in designing and manufacturing enhancement products for the VMS and UNIX environment at (800) 999-9MTI.



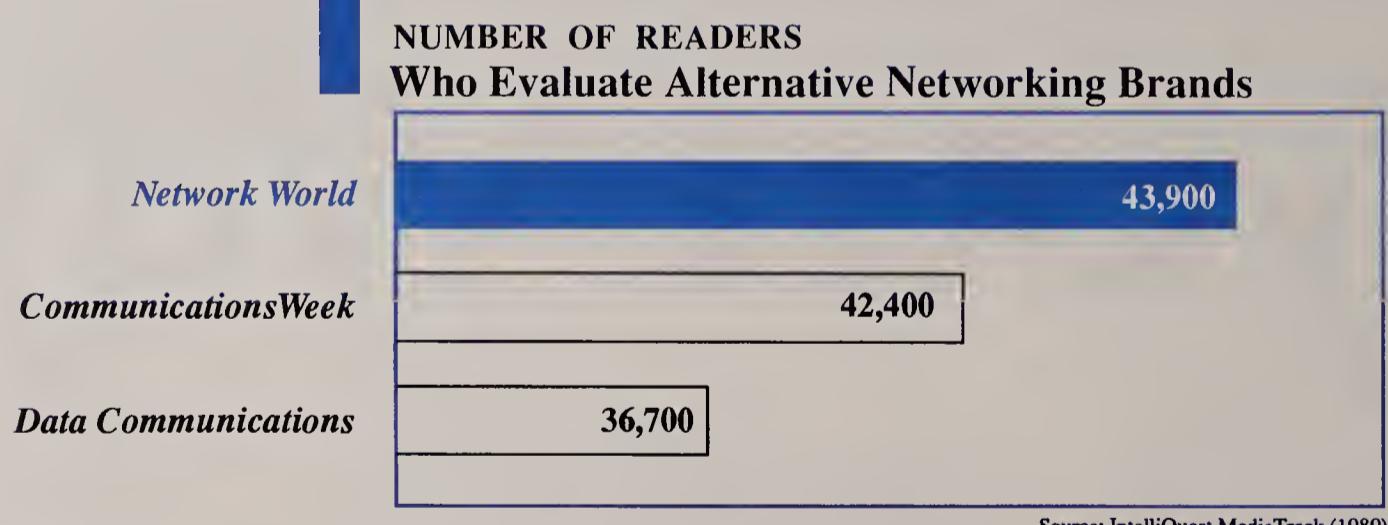
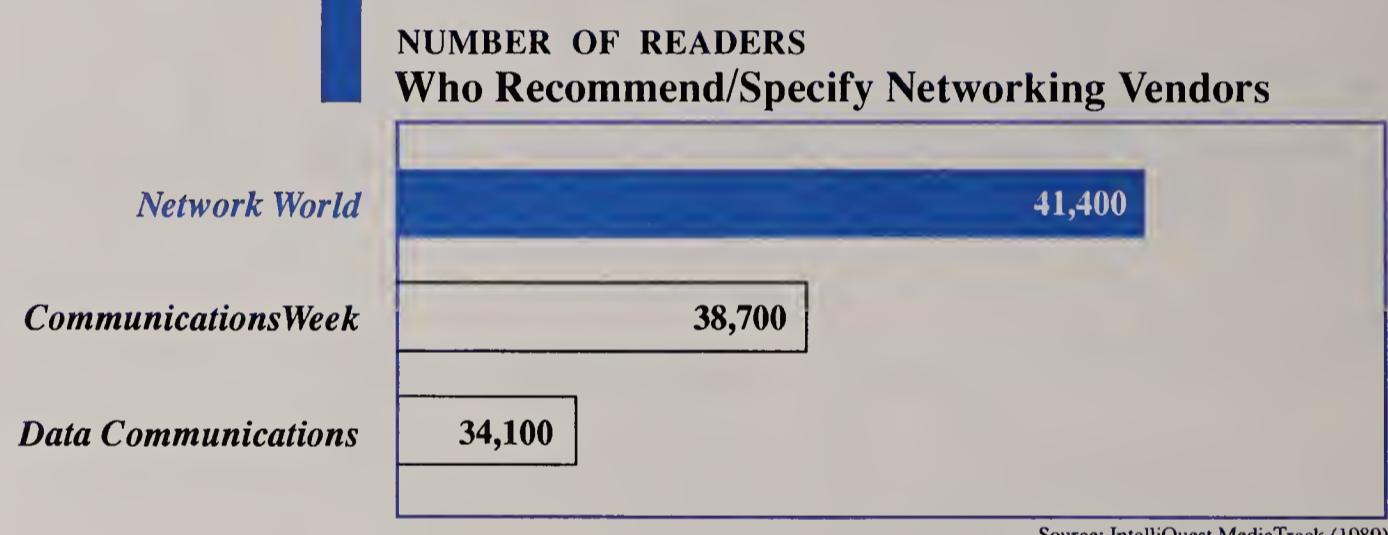
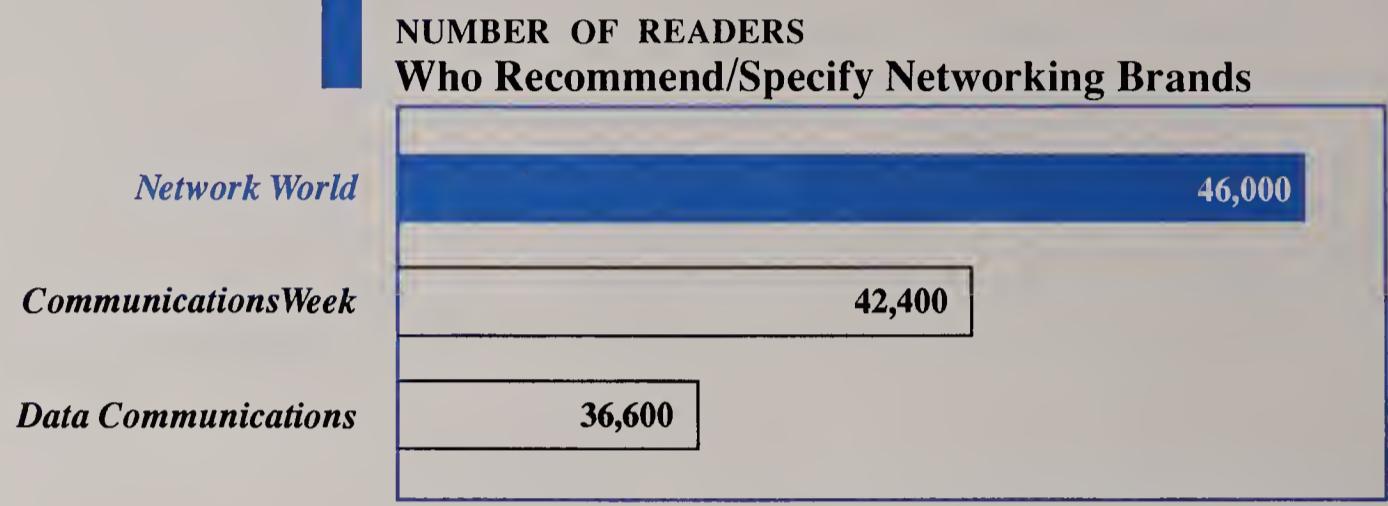
Micro Technology

5065 East Hunter Ave., Anaheim, CA 92807
(714) 970-0300 or (800) 999-9MTI
European Headquarters:
Munich, West Germany Tel: 089 470 8191

Inside this issue:

**MCI.
Sending
data
your way.**

■ *Network World* reaches MORE network decision makers THAN *CommunicationsWeek* AND *Data Communications*



For a copy of *Network World's* IntelliQuest Summary call
Evilee Lasker, Marketing Manager at 1-800-622-1108 today!

NETWORK WORLD